

# Table of Contents

Executive Summary..... 1

Residential and Commercial Customer Growth Forecast..... 9

Industrial Forecast ..... 22

Usage Per Customer Under Design Degree Days ..... 28

Design Heating Degree Days ..... 31

Traditional Supply Side Resources..... 36

Non-Traditional Resources ..... 49

Distribution System Modeling ..... 51

Promoting The Efficient Use of Natural Gas ..... 53

Resource Optimization ..... 57

## Table of Exhibits

- Exhibit No. 1    Appendix A John Church Economic Forecast  
                      Appendix B IGC Penetration Rates  
                      Appendix C IGC Conversion Rates  
                      Appendix D Base Case - New Customers, Adjustments and Total Customers  
                      Appendix E High Growth - New Customers, Adjustments & Total Customers  
                      Appendix F Low Growth - New Customers, Adjustments & Total Customers
- Exhibit No. 2    Appendix A Regression Equations & Statistics  
                      Appendix B Regression Equation - Examples  
                      Appendix C Regression Data - Therms, Binary and Degree Days
- Exhibit No. 3    Appendix A Design - Base Case Load Duration Curve Data  
                          Appendix A.1 Total Company - Annual Summary Data  
                          Appendix A.2 Total Company - Load Duration Curve Charts  
                          Appendix A.3 Total Company - Daily Detail Data  
                          Appendix A.4 Idaho Falls - Annual Summary Data  
                          Appendix A.5 Idaho Falls - Load Duration Curve Charts  
                          Appendix A.6 Idaho Falls - Daily Detail Sheet  
                          Appendix A.7 Sun Valley - Annual Summary Data  
                          Appendix A.8 Sun Valley - Load Duration Curve Charts  
                          Appendix A.9 Sun Valley - Daily Detail Data  
                          Appendix A.10 Canyon County - Annual Summary Data  
                          Appendix A.11 Canyon County - Load Duration Curve Charts  
                          Appendix A.12 Canyon County - Daily Detail Data
- Appendix B Design - High Growth Load Duration Curve Data  
                          Appendix B.1 Total Company - Annual Summary Data  
                          Appendix B.2 Total Company - Load Duration Curve Charts  
                          Appendix B.3 Total Company - Daily Detail Data  
                          Appendix B.4 Idaho Falls - Annual Summary Data  
                          Appendix B.5 Idaho Falls - Load Duration Curve Charts  
                          Appendix B.6 Idaho Falls - Daily Detail Data  
                          Appendix B.7 Sun Valley - Annual Summary Data  
                          Appendix B.8 Sun Valley - Load Duration Curve Charts  
                          Appendix B.9 Sun Valley - Daily Detail Data  
                          Appendix B.10 Canyon County - Annual Summary Data  
                          Appendix B.11 Canyon County - Load Duration Curve Charts  
                          Appendix B.12 Canyon County - Daily Detail Data

Exhibit No. 3 (Continued)

Appendix C Design - Low Growth Load Duration Curve Data  
Appendix C.1 Total Company - Annual Summary Data  
Appendix C.2 Total Company - Load Duration Curve Charts  
Appendix C.3 Total Company - Daily Detail Data  
Appendix C.4 Idaho Falls - Annual Summary Data  
Appendix C.5 Idaho Falls - Load Duration Curve Charts  
Appendix C.6 Idaho Falls - Daily Detail Data  
Appendix C.7 Sun Valley - Annual Summary Data  
Appendix C.8 Sun Valley - Load Duration Curve Charts  
Appendix C.9 Sun Valley - Daily Detail Data  
Appendix C.10 Canyon County - Annual Summary Data  
Appendix C.11 Canyon County - Load Duration Curve Charts  
Appendix C.12 Canyon County - Daily Detail Data

Exhibit No. 4 Appendix A Map of Pipelines and Supply Basins  
Table 4.1 Congressional Acts and FERC Orders  
Chart 4.1 Historical Spot Prices

Exhibit No. 5 Diagram 5.1 Arc and Node Representation  
Diagram 5.2 Arc and Node Definition  
Table 5.1 Aggregation of Calendar Days into Model Periods  
Table 5.2 Projected Natural Gas Prices by Basin  
Table 5.3 Pricing for Supply Inputs  
Appendix A Model Inputs - Demand  
Appendix B Model Inputs - Supply  
Appendix C Model Inputs - Transportation  
Appendix D Model Results - Base Case  
Appendix E Model Results - High Growth  
Appendix F Model Results - Low Growth  
Appendix G Public Workshop Announcement

Exhibit No. 6 DVD: Conservation Hints and Tips

## **Intermountain Gas Company Integrated Resource Plan Executive Summary**

Natural gas continues to be the fuel of choice in Idaho. Southern Idaho's manufacturing plants, commercial businesses, new homes and anticipated new electric power plants, all rely on natural gas to provide an economic, efficient, environmentally friendly and most comfortable form of heating energy. Intermountain Gas Company endorses and encourages the wise and efficient use of energy in general and, in particular, natural gas for high efficient uses in Idaho and Intermountain's service area (see Pages 49-52). Forecasting the demand of Intermountain's growing customer base is a regular part of Intermountain's operations, as is determining how to best meet the load requirements brought on by this demand. Public input is an integral part of this planning process. The customer demand forecast and resource decision making process is ongoing. This Integrated Resource Plan document represents a snapshot in time similar to a balance sheet. It is not meant to be a prescription for all future energy resource decisions, as conditions will change over the planning horizon impacting areas covered by this Plan. Rather, this document is meant to describe the currently anticipated conditions over the five-year planning horizon, the anticipated resource selections and the process for making those resource decisions. The planning process described herein is an integral part of Intermountain's ongoing commitment to make the wise and efficient use of natural gas an important part of Idaho's energy future.

### **Backdrop**

Intermountain Gas Company ("Intermountain") is the sole distributor of natural gas in Southern Idaho. Its service area extends across the entire breadth of Southern Idaho, an area of 50,000 square miles, with a population of approximately 1,000,000. During fiscal year 2003, Intermountain served an average of 242,000 customers in 74 communities through a system of approximately 9,500 miles of transmission, distribution and service lines. Over 351 miles of transmission, distribution and service lines were added during fiscal 2003 to accommodate new customer additions and maintain service for Intermountain's growing customer base.

The economy of Intermountain's service area is based primarily on agriculture and related industries. Major crops are potatoes and sugar beets. Major agriculture-related industries include food processing and production of phosphate minerals. Other significant industries are electronics, general manufacturing, services and tourism.

Intermountain provides natural gas sales and services to two major markets: the residential/commercial market and the industrial market. During the first quarter of fiscal year 2004, an average of 224,000 residential and 25,000 commercial customers used natural gas primarily for space and water heating, compared to an average of 213,000 residential and 25,000 commercial customers in the first quarter fiscal year 2003. This equates to an increase in average residential and commercial customers of 5%.

Intermountain's industrial customers transport natural gas through Intermountain's system to be used for boiler and manufacturing applications, as well as feedstock in the production of chemical fertilizers. Industrial demand for natural gas is strongly influenced by the agricultural economy and the price of alternative fuels. Forty-Eight percent (48%) of the throughput on Intermountain's system during fiscal 2003 was attributable to industrial sales and transportation.

Intermountain's peak day loads (throughput during the projected coldest winter day) are growing at a manageable rate. The growth in Intermountain's projected peak day load is attributable to two factors: 1) growth in Intermountain's customer base, primarily residential and commercial, and 2) production related growth occurring in Intermountain's industrial firm transportation market which impacts Intermountain's distribution system while not impacting the need for additional interstate pipeline capacity (See Firm Contract Demand, Page 25).

The customer growth forecast<sup>1</sup> was analyzed and forecast not only from a total company perspective but also by specific geographic regions within Intermountain's service territory. The regions were selected based upon the anticipated or known need for system upgrades within each specific region. The regions, as more fully delineated later in this document, consist of The Idaho Falls Lateral Region, The Sun Valley Lateral Region, The Canyon County Region and the "All Other" Region.

Peak day sendout studies and load duration curves were developed under design weather conditions (see page 31) to determine the magnitude and timing of future deficiencies in firm peak day delivery capability from both a total company interstate mainline perspective, as well as within each specific geographic region. Residential, commercial and industrial customer peak day sendout was matched against available resources to determine which combination of new resources would be needed to meet Intermountain's future peak day delivery requirements at the best possible cost.

## **Forecast Peak Day Sendout**

### **Total Company**

Residential, commercial and industrial peak day load growth on Intermountain's system under design conditions is forecast over the five-year period to grow at an average annual rate of 4%. The table below summarizes the forecast for peak day sendout under the "base case" customer growth assumption.

#### **LOAD DURATION CURVE - TOTAL COMPANY DESIGN BASE CASE**

(Volumes in Therms)

	<b><u>NWP Firm Transport Capacity</u></b>	<b><u>Peak Day Sendout</u></b>			<b><u>Incremental Peak Day Sendout</u></b>		
		<b><u>Core Market</u></b>	<b><u>Industrial Firm CD</u></b>	<b><u>Total</u></b>	<b><u>Core Market</u></b>	<b><u>Industrial Firm CD<sup>1</sup></u></b>	<b><u>Total</u></b>
FY05	2,403,300	3,499,800	223,890	3,723,690			
FY06	2,463,300	3,632,070	223,890	3,855,960	132,270	0	132,270
FY07	2,463,300	3,825,120	223,890	4,049,010	193,050	0	193,050
FY08	2,463,300	3,968,160	223,890	4,192,050	143,040	0	143,040
FY09	2,463,300	4,108,150	223,890	4,332,040	139,990	0	139,990

<sup>1</sup> Future growth in transport CD is limited to T-4, which does not affect Intermountain's interstate pipeline capacity requirements.

The above table highlights the fact that growth in the peak day is commensurate with the growth projected to occur in Intermountain's residential and small commercial customer markets.

### **Existing Resources:**

<sup>1</sup> Multiple residential and commercial customer growth scenarios were developed. Each scenario ("base case", "high" and "low") was driven by the potential for varying outcomes of Idaho's economy (See Pages 9-21.)

Intermountain's existing firm delivery capability on the peak day is made up of the resources shown on the following page.

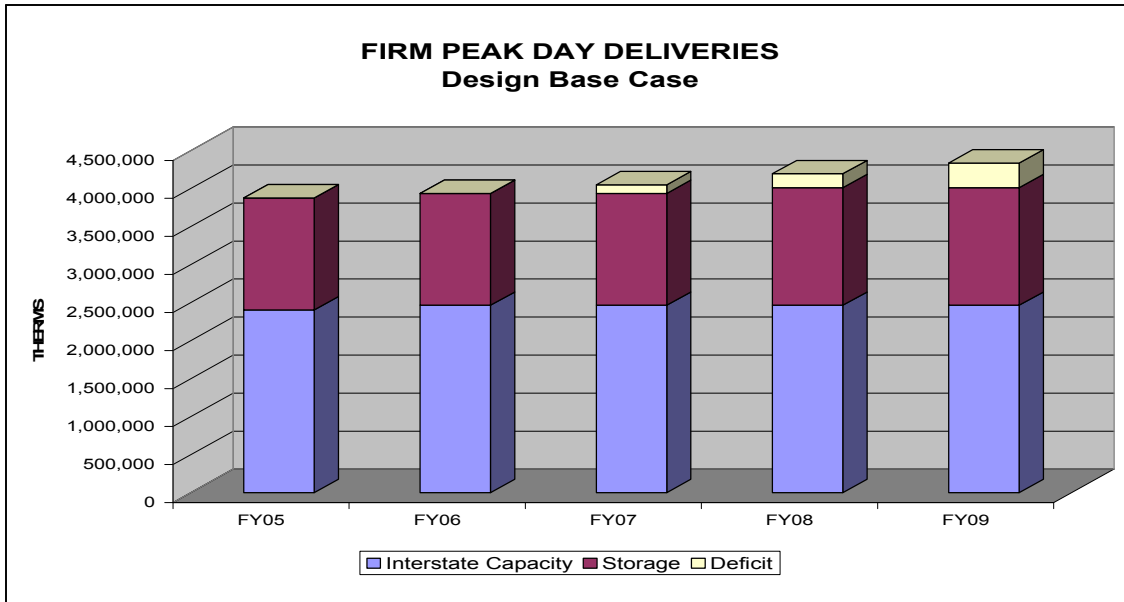
<b>PEAK DAY FIRM DELIVERY CAPABILITY</b>			
<b>(Volumes in Therms)</b>			
	<u>FY05</u>	<u>FY06-FY07</u>	<u>FY08-FY09</u>
Maximum Daily Storage Withdrawals:			
Nampa LNG	600,000	600,000	600,000
Plymouth LS	720,000	720,000	720,000
Jackson Prairie SGS	<u>150,000</u>	<u>150,000</u>	<u>225,000</u>
Total Storage	1,470,000	1,470,000	1,545,000
Maximum Deliverability (NWP)	<u>2,403,300</u>	<u>2,463,300</u>	<u>2,463,000</u>
Total Peak Day Deliverability	<u>3,873,300</u>	<u>3,933,300</u>	<u>4,008,300</u>

When forecasted peak day sendout is matched against existing resources, a peak day delivery deficit occurs during January 2007 and increases as depicted on the following table.

<b>FIRM DELIVERY DEFICIT - TOTAL COMPANY DESIGN BASE CASE</b>					
<b>(Volumes in Therms)</b>					
	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>
Peak Day Deficit <sup>1</sup>	0	0	115,710	183,750	323,740
Total Winter Deficit <sup>2</sup>	0	0	115,710	197,110	470,990
Days Requiring Additional Resources	0	0	1	2	2

<sup>1</sup>Peaking storage increases by 75,000 therms per day in FY05 which reduces the deficit thereafter.

<sup>2</sup>Equal to the total winter sendout in excess of interstate capacity less total "peaking" storage. Peaking storage does not require the use of Intermountain's traditional interstate capacity to deliver inventory to the citygate.



Because Intermountain's storage gas has been dispatched or "rationed" around the peak day in order to meet the higher demand days first, a deficit of firm capacity begins to occur "around" the peak day during the "shoulder months" under design conditions beginning in the winter of 2007.

Firm transportation capacity will be secured by Intermountain during these projected deficit shoulder periods. Intermountain, together with its gas procurement agent, is performing an extensive evaluation of the most advantageous way to eliminate this deficit taking into consideration first of all firm delivery capability to Intermountain's core market together with economic efficiency. The projected deficits in firm deliverability will be eliminated in a timely manner through one or more means including, but not limited to, 1) long-term firm capacity release and/or segmentation, 2) city gate deliverable gas supply, 3) storage together with related mainline rights and, 4) call back opportunities.

## Regional Studies

As mentioned above, certain geographic regions within Intermountain's service territory were analyzed based upon the anticipated or known need for distribution system upgrades within each specific region. Not unlike the total company interstate mainline perspective, the projected peak day sendout for each region was measured against the known distribution capacity available to serve that region. In addition to the firm delivery requirements for Intermountain's residential and commercial customers, the needs of those industrial customers contracting for firm distribution only transportation service (Intermountain's "T-4" customers) were also included as part of these regional studies. A wide array of alternatives were evaluated in determining the potential way to best meet the projected deficits in the various regions within Intermountain Gas Company (see "Non-Traditional Resource Options" - Page 45). Additionally, each region is analyzed within the framework of the Company's Distribution System Model (See Page 47).

### Idaho Falls Lateral Region

The Idaho Falls Lateral ("IFL") is 104 miles in length and serves a number of cities between Pocatello in the south to St. Anthony in the north. The customers served off the IFL represent a diverse base of residential, commercial and large industrial customers. The residential, commercial and industrial load served off the IFL represents approximately 16% of the total company customers and 20% of the company's total winter sendout during the winter of 2003-2004.

When forecasted peak day sendout on the IFL is matched against the existing peak day distribution capacity (690,000 therms), a peak day delivery deficit occurs during 2005 and increases at levels shown on the following tables:

### LOAD DURATION CURVE - IDAHO FALLS DESIGN BASE CASE

(Volumes in Therms)

	Existing Distribution Transport Capacity	Peak Day Sendout			Incremental Peak Day Sendout		
		Core Market	Industrial Firm CD <sup>1</sup>	Total	Core Market	Industrial Firm CD <sup>2</sup>	Total
<b>FY05</b>	690,000	546,650	243,040	789,690			
<b>FY06</b>	690,000	566,380	243,040	809,420	19,730	0	19,730
<b>FY07</b>	690,000	594,240	243,040	837,280	27,860	0	27,860
<b>FY08</b>	690,000	614,680	243,040	857,720	20,440	0	20,440
<b>FY09</b>	690,000	636,460	243,040	879,500	21,780	0	21,780

<sup>1</sup>Existing firm contract demand includes T-1, T-2 and T-4 , and Idaho Falls Compressors Station requirements.

<sup>2</sup>Future growth in transport CD is limited to T-4 which only impacts Intermountain's distribution capacity requirements.

### FIRM DELIVERY DEFICIT - IDAHO FALLS DESIGN BASE CASE

(Volumes in Therms)

	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>
Peak Day Deficit	99,690	119,420	147,280	167,720	189,500
Total Winter Deficit <sup>1</sup>	240,720	313,900	395,940	479,210	565,670
Days Requiring Additional Capacity	4	4	4	4	6

<sup>1</sup>Equal to the total winter sendout in excess of distribution capacity.

The industrial customer base on the IFL is unique in that several of these customers have the potential and ability to mitigate peak day consumption by switching to fuel oil during extreme cold temperatures. Although these customers prefer using natural gas to any other fuel alternative, Intermountain believes that small, short duration peak day distribution delivery deficits in the future can be eliminated or at least mitigated by working with these customers to facilitate the use of fuel oil at these customer's facilities. However, the projected delivery deficits are of such magnitude that "looping" of the existing system is warranted adding the necessary firm delivery capability to that area.

### Sun Valley Lateral Region

The residential, commercial and industrial load served off the Sun Valley Lateral ("SVL") represents approximately 4% of the total company customers and 4% of the company's total winter sendout during the winter of 2003-2004.

When forecasted peak day sendout on the Sun Valley Lateral ("SVL") is matched against the existing peak day distribution capacity (144,000 therms), a peak day delivery deficit occurs during 2005 and increases at the levels shown on the following tables:



### LOAD DURATION CURVE - SUN VALLEY DESIGN BASE CASE

(Volumes in Therms)

	Existing Distribution Transport Capacity	Peak Day Sendout			Incremental Peak Day Sendout		
		Core Market	Industrial Firm CD <sup>1</sup>	Total	Core Market	Industrial Firm CD <sup>2</sup>	Total
<b>FY05</b>	144,000	137,980	8,150	146,130			
<b>FY06</b>	144,000	141,780	8,150	149,930	3,800	0	3,800
<b>FY07</b>	144,000	147,750	8,150	155,900	5,970	0	5,970
<b>FY08</b>	144,000	151,840	8,150	159,990	4,090	0	4,090
<b>FY09</b>	144,000	156,350	8,150	164,500	4,510	0	4,510

<sup>1</sup>Existing firm contract demand includes T-1, T-2 and T-4 requirements.

<sup>2</sup>Future growth in transport CD is limited to T-4 which only impacts Intermountain's distribution capacity requirements.

### FIRM DELIVERY DEFICIT - SUN VALLEY DESIGN BASE CASE

(Volumes in Therms)

	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>
Peak Day Deficit	2,130	5,930	11,900	15,990	20,500
Total Winter Deficit <sup>1</sup>	2,130	7,590	17,450	25,450	34,280
Days Requiring Additional Capacity	1	2	2	2	2

<sup>1</sup>Equal to the total winter sendout in excess of distribution capacity.

As can be seen from the above table, growth along the SVL warrants an upgrade to the existing pipeline system. The tourism industry driven industrial load on the SVL is limited in size and does not currently have the capability to switch to alternative fuels as a means of mitigating peak day sendout. Again, a wide array of alternatives were evaluated in determining the potential ways to best meet the projected deficits. Intermountain plans to increase the delivery capability and ultimate capacity on the SVL through a series of cost effective system upgrades to be performed over the next several years.

### Canyon County Region

The residential, commercial and industrial load served off the Canyon County Lateral ("CCL") represented approximately 14% of the total company customers and 17% of the company's total winter sendout during the winter of 2003-2004.

When forecasted peak day sendout on the Canyon County Lateral CCL is matched against the existing peak day distribution capacity (595,000 therms), a peak day delivery deficit occurs during 2006 and increases at the levels shown on the following tables:

### LOAD DURATION CURVE - CANYON COUNTY DESIGN BASE CASE

(Volumes in Therms)

	Existing Distribution Transport Capacity	Peak Day Sendout			Incremental Peak Day Sendout		
		Core Market	Industrial Firm CD <sup>1</sup>	Total	Core Market	Industrial Firm CD <sup>2</sup>	Total
<b>FY05</b>	595,000	495,720	94,140	589,860			
<b>FY06</b>	595,000	518,510	94,140	612,650	22,790	0	22,790
<b>FY07</b>	595,000	550,540	94,140	644,680	32,030	0	32,030
<b>FY08</b>	595,000	572,580	94,140	666,720	22,040	0	22,040
<b>FY09</b>	595,000	589,840	94,140	683,980	17,260	0	17,260

<sup>1</sup>Existing firm contract demand includes T-1, T-2 and T-4 requirements.

<sup>2</sup>Future growth in transport CD is limited to T-4 which only impacts Intermountain's distribution capacity requirements.

### FIRM DELIVERY DEFICIT - CANYON COUNTY DESIGN BASE CASE

(Volumes in Therms)

	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>
Peak Day Deficit	0	17,650	49,680	71,720	88,980
Total Winter Deficit <sup>1</sup>	0	19,730	75,740	122,910	164,190
Days Requiring Additional Capacity	0	2	2	3	4

<sup>1</sup>Equal to the total winter sendout in excess of distribution capacity.

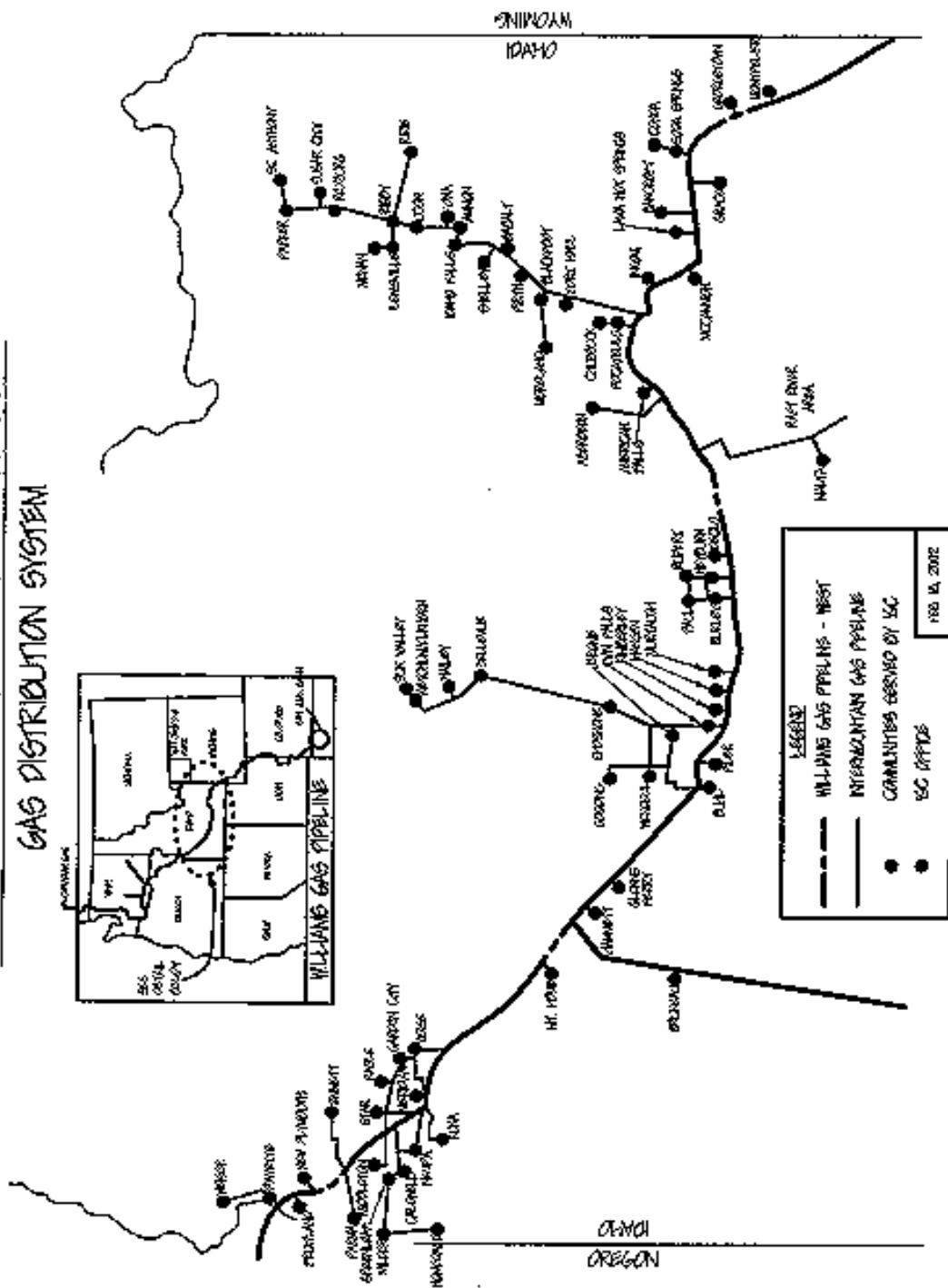
While diverse in nature, the industrial customer base served by CCL does not currently have the capability to switch to alternative fuels as a means of mitigating peak day sendout and Intermountain is currently exploring optional means of enhancing the distribution capability on this Lateral.

### Summary

Residential, commercial and industrial customer growth and its consequent impact on Intermountain's distribution system was analyzed using design weather conditions under various projected outcomes of Idaho's economy. Peak day sendout under each of these customer growth scenarios were measured against the available natural gas delivery systems to project the magnitude and timing of delivery deficits, both from a total company perspective as well as a regional perspective. The resources brought to bear to meet these projected deficits were analyzed within a framework of options, both traditional and non-traditional, to help determine the most cost-effective means available to manage these deficits. In utilizing these various options, Intermountain's core market and firm transportation customers will continue to rely on uninterrupted firm service both now and in the years to come.

# INTERMOUNTAIN GAS COMPANY

## GAS DISTRIBUTION SYSTEM



## RESIDENTIAL AND COMMERCIAL CUSTOMER GROWTH FORECAST

This section of the Intermountain Gas Company (IGC) Integrated Resource Plan (IRP) describes and summarizes the residential and commercial customer growth forecast for the years 2005 through 2009. This forecast provides the anticipated magnitude and direction at IGC's residential and small customer growth by IGC Distribution System Segments for IGC's current service territory. Customer growth is the primary driving factor in IGC's five-year demand forecast contained within IGC's IRP.

The Segments are as follows:

- The Canyon County Segment, which consists of the Core Market Customers in Canyon County.
- The Sun Valley Lateral Segment, consisting of the Core Market Customers in Blaine and Lincoln Counties.
- The Idaho Falls Lateral Segment, consisting of the Core Market Customers in Bingham, Bonneville, Fremont, Jefferson, and Madison Counties, along with approximately 25% of the Core Market Customers in Pocatello, Bannock County.
- The All Other Customers Segment, consisting of the Core Market Customers in Bear Lake, Caribou, Cassia, Elmore, Gem, Gooding, Jerome, Minidoka, Owyhee, Payette, Power, Twin Falls, and Washington Counties. Additionally, 75% of the Core Market Customers in Pocatello, Bannock County, as well as the rest of Bannock County, are included in this segment.

IGC's customer growth forecast includes three (3) key components:

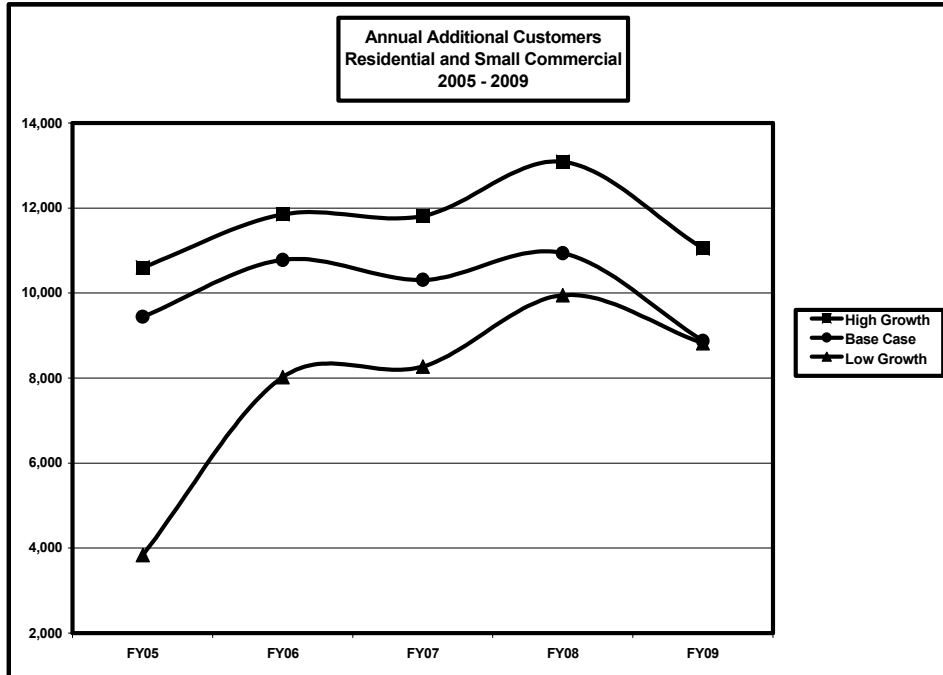
- Residential New Construction Customers
- Residential Customers who convert to natural gas from an alternative fuel
- Small Commercial Customers

To calculate the number of customers added each year, the annual change in households for each county in the IGC Service Territory is determined using the Idaho Economics 2003 Economic Forecast for the State of Idaho by John S. Church (Church Forecast), dated May 2003. Using the assumption that a new household means a new dwelling is needed, the annual change in households by county is multiplied by IGC's market penetration rate in that region to determine the additional residential new construction customers. Next, that number is multiplied by the IGC conversion rate, which is the anticipated percentage of conversion customers relative to new construction customers in those locales. This results in the number of expected residential conversion customers, and when added to the residential new construction numbers, the total expected additional residential customers across the periods is derived, by county.

The residential new construction numbers by county are multiplied by the IGC commercial rate, which is the anticipated percentage of commercial customers relative to residential new construction customers in those locales, to arrive at the number of expected additional small commercial customers.

The residential numbers must be split across our two residential rate classes, RS-1 and RS-2, since these classes have different load patterns. RS-1 is a customer who does not have both a gas furnace and a gas water heater, regardless of other appliances. RS-2 customers have at least a gas furnace and a gas water heater. Virtually 100% of IGC's residential new construction customers go RS-2, while only regionally varying percentages of IGC's residential conversion customers go RS-2. So, the additional residential conversion customers are split, depending on the region.

The Church Forecast contains three economic scenarios: base case, low growth, and high growth. IGC has incorporated these scenarios into the customer growth model, and has developed three five-year core market customer growth forecasts. The following graph shows the annual additional customers for each of the three economic scenarios.



The following table shows the results from the 5-year customer growth model for each scenario for the total customers at each year-end, and the annual additional, or incremental, customers:

TOTAL CUSTOMERS

ANNUAL ADDITIONAL CUSTOMERS

	Range as a % Of Base Case	Average as a % of Base Case	Range as a % Of Base Case	Average as a % of Base Case
Low Growth	96% - 98%	97%	41% - 99%	77%
Base Case	100% - 100%	100%	100% - 100%	100%
High Growth	100% - 103%	101%	112% - 124%	116%
	Range (2005 – 2009)	Average	Range (2005 – 2009)	Average
Low Growth	262,852 – 297,913	279,975	3,837 – 9,948	7,780
Base Case	268,458 – 309,361	289,418	9,443 – 10,939	10,069
High Growth	269,617 – 317,418	293,630	10,602 – 13,089	11,681

The following sections explore, more fully, the different components of the customer forecast, including the Church Forecast, market penetration and conversion rates, and small commercial growth.

## **Household Projections / Church Forecast**

The May 2003 Church Forecast provides county by county projections of output, employment and wage data for 21 industry categories for the State of Idaho, as well as a population and household forecast. This simultaneous equation model uses personal income and employment by industry as the main economic drivers of the forecast. This model uses forecasts of national inputs and demands for those sectors of the Idaho economy having a national or international exposure. Industries that do not have as large a national profile, and are thus serving local communities and demands are considered secondary industries. Local economic factors, rather than the national economy determine demand for these products.

The Church Forecast uses two methods for population projections: (1) a cohort-component population model in which annual births and deaths are forecast, and then the net number is either added to or subtracted from the population, and (2) an econometric model which forecasts population as a function of economic activity. The two forecasts are then compared and reconciled for each quarter of the forecast. Migration into or out of the state is arrived at in this reconciliation.

As previously mentioned, the Church Forecast provides three scenarios: (1) base case, (2) high growth, and (3) low growth. The base case scenario assumes a normal amount of economic fluctuation, a normal business cycle. This becomes the standard against which changes in customer growth, as affected by the low and high growth scenarios can be measured.

## **High and Low Economic Growth Scenarios**

The High and Low Growth Scenarios of the 2003 Economic Forecast present alternative views of the economic future of Idaho and its 44 counties. The High Growth Scenario of the Economic Forecast presents a long-term vision of rapidly growing economy in Idaho. For example, the High Growth Scenario produces a projected statewide population of 1,860,000 in the year 2020 versus a Base Case Scenario Idaho population forecast of 1,699,000 in the same year. This scenario presents an absolute population gain of nearly 549,000 over Idaho's estimated 2001 population of 1,311,000 and an annual average compound rate of population growth of 1.9% per year.

Alternatively, the Low Growth Scenario of the 2003 Economic Forecast does not present a rosy economic outlook for the state of Idaho. In the Low Growth Scenario, Idaho's 2020 population is projected to reach the much lower level of 1,607,000. The Low Growth Scenario's projected 2020 population is 296,000 above Idaho's 2001 population – an annual average compound growth rate of 1.1% per year.

While the High and Low Growth Scenarios of the Economic Forecast represent two significantly different views of Idaho's economic future, they are not unprecedented. An examination of historic employment, population, and household growth over the 1970 through 2000 period was performed. This examination, using either 5-year or 10-year moving averages of the growth of 1-digit SIC code employment concepts, population, and households in order to dampen the effects of peak periods of economic growth, revealed that historic levels have in fact exceeded the projected rates of growth in both the High and Low Growth Scenarios of the 2003 Economic Forecast.

An examination of the possible economic and demographic events that could produce the economic and population growth projected in the High and Low Growth Scenarios is outlined below.

## **The High Growth Economic Forecast Scenario:**

Since the mid-1980s Idaho's engine of growth has been the extraordinary growth that it has experienced in the manufacturing industries. Today Idaho manufacturing firms are in the midst of an economic slowdown as are many manufacturing industries nationally and internationally. Nevertheless, the current recession has lessened the long-term attractiveness of manufacturing in Idaho.

Idaho manufacturing firms express many reasons for the state's attractiveness to manufacturing industries. Idaho has a relatively young and educated labor force. Many express that the cost of doing business in Idaho is lower than in many other areas of the nation. The facets of these lower costs most often cited are: lower property taxes, lower rates on workman's compensation and unemployment insurance, a lower level of government regulation, mandates or restrictions that add costs to doing business, lower land costs, lower energy costs, and lower labor costs.

A few Idaho manufacturing firms that have operations in other areas of the US have indicated that the lower labor costs available in Idaho have allowed them to maintain a competitive edge in the world marketplace for their products. And, indirectly have further cut their labor and training costs and have enhanced labor productivity. These firms indicate that in order to remain competitive in a worldwide marketplace for their product they must keep labor costs to a minimum. However, the cost of labor in other parts of the US where the cost-of-living is high dictates that they must either pay a high wage rate or suffer high rates of labor turnover, with the adjunctive expense of higher training costs and lower levels of labor productivity. In Idaho these firms have found that they can compensate their labor with a wage that allows them remain competitive in the marketplace and provide the worker with a reasonable standard of living. This in turn cuts labor turnover, training expenses, and increases labor productivity.

However, even in the High Growth Scenario not all of the state's existing manufacturing firms will grow in the future. Idaho's manufacturing industries of Lumber and Wood Products, Food and Kindred Products, and Chemicals and Allied Products industries are likely to face a long-term decline in activity and employment levels in almost any scenario.

In addition, two other traditional mainstay Idaho industries, Mining and Agriculture, are likely to face a long-term future of no-growth or a slow level of decline in both levels of output and employment. The difference between the economic outlooks for these industries presented in the High and Low Growth Scenarios of the 2003 Economic Forecast is how rapid that rate of decline will be in the future.

Underpinning the High Growth Scenario is a continuation of stellar growth of Idaho's manufacturing industries. The pattern of these future manufacturing employment gains are expected to look similar to the manufacturing growth experienced in Idaho during the 1990s – largely concentrated in the “high-tech” manufacturing industries of Non-electrical Machinery, Electrical and Electronic Equipment, and Instruments. Furthermore, these future manufacturing employment gains are likely to be, as they were in the 1990s, spatially concentrated in the state. Five Idaho counties, Ada, Canyon, Bannock, Bonneville, and Kootenai, accounted for nearly ninety percent of the state's overall manufacturing employment gains in the 1990s. With the exception of Kootenai County, all of the above counties are within the Intermountain Gas Company service area.

Idaho remains attractive to the high-tech industries. New firms (to Idaho) continue to make inquiries about locating within the state. While the number of these inquiries slowed as the US economy went into recession, the current reports are that they have increased significantly after September 11. In addition to the probability of manufacturing firms locating operations in Idaho, is the continued development of many “spin-off” manufacturing or service industry firms from the state's existing manufacturing industries. In the Boise MSA alone, these “spin-off” establishments have directly created nearly 5,000 jobs locally over the past fifteen years.

These projected manufacturing employment gains, in turn, spur employment growth in the secondary industries found in the affected and nearby communities. These secondary industries include employment in Transportation, Communications, and Utilities; Construction; Wholesale and Retail Trade; Finance, Insurance and Real Estate; the Service industries; and local serving elements of Government.

In the High Growth Scenario other basic industry sectors of the Idaho economy would contribute to future employment gains. A renewed interest in nuclear power as a means of generating electricity would bring

renewed vigor and increased levels of employment to the US Department of Energy's Idaho Nuclear and Environmental Laboratory (INEEL). In addition, nuclear waste clean-up activities at INEEL are programmed to accelerate in the next decade, causing a further upswing in INEEL employment levels. Indirectly, these would boost secondary industry employment growth in the Eastern Idaho counties of Bannock, Bingham, Bonneville, Jefferson, and Madison – all within the Intermountain Gas Company service area.

Mountain Home Air Force Base, fifty-five miles southeast of Boise, would experience a modest expansion of assigned personnel in the High Growth Scenario. The Gowen Field Idaho National Guard facility in Boise would expand from its current level of nearly 1,000 full-time assigned military personnel to nearly 1,200 assigned personnel in the High Growth Scenario.

Historically, federal government civilian employment in Idaho has been on a path of slow decline for many years. Federal government employment in the state has always had a very large proportion dedicated to the management and maintenance of the federal forests and rangelands. These management functions have been cut to the barest levels over the past two decades. The High Growth Scenario anticipates that federal employment associated with the management of federal lands will stabilize in the future.

However, the federal employment in Idaho that is primarily serving the local population (the federal courts, IRS, EPA, OSHA, EDA, FBI, DEA) will increase in the future as Idaho's population increases. In addition, the National Fire Center (an inter-agency facility in Boise for the purpose of combating forest and rangeland fires anywhere in the US) is likely to continue to gain employment in the future.

Many of Idaho's secondary industries, usually those industries that are deemed to be predominantly local serving, have a significant proportion of employment that could be classified as basic industry jobs. That is, they are serving a population or market that is much broader (perhaps international, national, or regional in scale) than just the local economic area. Some examples include: Washington Group construction, the corporate headquarters functions of Albertson's and Boise Cascade, the Sears Regional Credit Center, Capital One's Boise Call Center, Hewlett-Packard's Boise Call Center, or Direct TV. The expansion and enhancement of Idaho's telecommunications infrastructure has permitted these firms to locate these customer service functions in areas far removed from the nation's large population centers, such as Boise.

It is estimated that in 2000 there were nearly 7,000 jobs within the Boise MSA associated with these customer transaction centers, and over ninety percent of those jobs could be classified as basic industry employment. The High Growth Scenario assumes that this trend will continue in the future. Idaho will capture a greater number of customer transaction facilities. Most of those new facilities will be located, as they are today, near the state's concentration of population and labor force, in Southwest Idaho within the Intermountain Gas Company service area.

### **The Low Growth Economic Forecast Scenario:**

In the Low Growth Scenario of the 2003 Economic Forecast Idaho's manufacturing industries do not provide the stimulus to growth as they have in the past. Today, many of Idaho's manufacturing firms are suffering under conditions caused by the current economic slowdown, as are many manufacturing industries nationally and internationally. However, the Low Growth Scenario of the 2003 Economic Forecast assumes that many of today's struggling manufacturing facilities will not survive the current recession.

In the Low Growth Scenario, the long-term employment decline in Idaho's Lumber and Wood Products industry accelerates. The state's Paper and Allied products manufacturing industry takes a serious hit to employment as its three corrugated cardboard box plants in southern Idaho close – (Boise Cascade - Nampa, and Longview Fiber plants - Twin Falls and Burley, Idaho).

Changes in US international trade policy causes the removal of the US's quotas on imported sugar. With the removal of these protective trade barriers, the US domestic beet sugar industry is not competitive with imported sugar in the domestic and international marketplace. Idaho is particularly affected by this change in



policy as the food processing plants involved in producing sugar from sugar beets cease operation in southern Idaho (at Nampa, Twin Falls, and Paul, Idaho) and eastern Oregon (Nyssa, Oregon). This causes the loss of nearly 3,500 seasonal and 1,200 full-time food processing jobs in southern Idaho. In addition, the transportation industry experiences a loss of another 350 jobs as the associated transportation services are no longer needed.

In addition, Idaho's Food Processing industry experiences a profound change in the marketplace for its primary Idaho product – the frozen processed potato in the form of a French fry. The baby-boom generation, the largest demographic component of the US population is aging, and becoming more health conscious. Nationwide, demand for frozen French fries declines and productivity gains in the production of frozen potato products accelerated rate of job losses the state's Food Processing industry.

Increased restrictions and/or higher costs associated with the grazing of cattle on federal lands causes a decline in the number of cattle raised in Idaho and another decline in Idaho's food processing employment.

Idaho's Mining and Agricultural industries accelerate their rate of decline in terms of output and employment.

In the Low Growth Scenario Idaho's "high-tech" manufacturing industries of Non-electrical Machinery, Electrical and Electronic Equipment, and Instruments are not immune from the slower rates of economic growth. The current recession permanently cripples some of the state's high-tech firm's.

Furthermore, Micron Technology changes production practices at its Boise plant. Currently, Micron Technology produces, as a computer memory chip – needing no further processing – as a final product from the Boise fabrication plant. However, many other US computer chip makers only manufacture the "wafer" at their US production plants. The "wafer", with its hundreds of computer chips etched and imprinted upon them, is then shipped to an overseas production facility for testing, final processing, and packaging. They commonly cite lower labor costs overseas as their primary reason for splitting the production process in this manner. The Low Growth Scenario assumes that Micron Technology changes their Boise operations in order to take advantage of the potential labor cost savings available overseas. In the Low Growth Scenario, this policy change causes the loss of nearly 5,000 manufacturing jobs in Idaho Electrical and Electronic Equipment Industry.

The Low Growth Scenario's projected manufacturing employment losses and accelerated rates of declining employment, in turn, dampen employment growth in the secondary industries found in the affected and nearby communities. Again, these secondary industries include employment in: Transportation, Communications, and Utilities; Construction; Wholesale and Retail Trade; Finance, Insurance and Real Estate; the Service industries; and local serving elements of Government.

In the Low Growth Scenario other industry sectors economy do not provide significant contributions to future employment gains. Employment at the US Department of Energy's Idaho Nuclear and Environmental Laboratory (INEEL) are cut as federal funding is further curtailed.

Mountain Home Air Force Base would experience a slow attrition in its capability and a gradual contraction in the number of total assigned military personnel in the Low Growth Scenario. The Gowen Field National Guard facility in Boise would also contract from its current level of nearly 1,000 full-time assigned military personnel to nearly 800 in the Low Growth Scenario.

Historically, federal government civilian employment in Idaho has been on a path of slow decline for many years. Federal government employment in the state has always had a very large proportion dedicated to the management and maintenance of the federal forests and rangelands. These management functions have been cut to the barest levels over the past two decades. The High Growth Scenario anticipates that federal employment associated with the management of federal lands will stabilize in the future. However, the rate of growth in Idaho federal government employment that is primarily serving the local population would decrease as the state's population growth slows.

Some of Idaho's corporate headquarters would experience employment losses as market forces and financial conditions force them to cut operating expenses. In addition, corporate mergers and/or acquisitions could force the closure of one of the state's larger call center operations with a resultant loss of nearly 1,000 jobs

## **Population**

In the High Growth Scenario Idaho's natural rate of population growth (population, plus births, minus deaths) remains near current levels – about 1.1% per year. However, the economic outlook with a projected high rate of employment growth in Idaho subsequently produces a high level of population in-migration to the state.

In the High Growth Scenario Idaho population is projected to increase at an annual average compound rate of 1.9% per year over the 2001 to 2020 period. Statewide population in the High Growth Scenario is projected to increase by 549,000 from 1,311,000 in 2001 to 1,860,000 in the year 2020. Furthermore, nearly 80% of that population growth is projected to occur in southern Idaho.

In the Low Growth Scenario Idaho's previously-described natural rate of population growth declines from its current level – near 1.1% per year – to a level that more closely matches the projected natural rate of US population growth – 0.7% per year. In addition, the Low Growth Scenario economic outlook with a projected low rate of employment growth in Idaho produces a modest level of population out-migration as Idaho fails to produce jobs at a rate high enough to satisfy the future job seekers.

In the Low Growth Scenario Idaho population is projected to increase at an annual average compound rate of 1.1% per year over the 2001 to 2020 period. Statewide population in the Low Growth Scenario is projected to increase by 296,000 from 1,311,000 in 2001 to nearly 1,607,000 in the year 2020. As in the High Growth Scenario, the expectations are that nearly 80% of that projected population growth will occur in southern Idaho.

## **Households**

The number of households in an area or region is a key factor utilized by many businesses in making estimates of the current or future customer base that they may serve. Historically, in Idaho as well as in the nation, the rate of household formation has exceeded the rate of population growth. During the 1970s and 1980s an increasing divorce rate, in conjunction with a delay in the age of first marriage, spurred household growth. In this forecast no specific changes are assumed concerning these sociologic characteristics; i.e., divorce rates and age of first marriage are not assumed to move up or down in either the High Growth or Low Growth Scenarios. The High and Low Growth Scenarios do project that changes in personal income growth will cause either increases or decreases in the rate of household formation. This phenomenon is due to the greater propensity for young adults to leave home and form their own households in prosperous periods, but not as quickly in periods of recession.

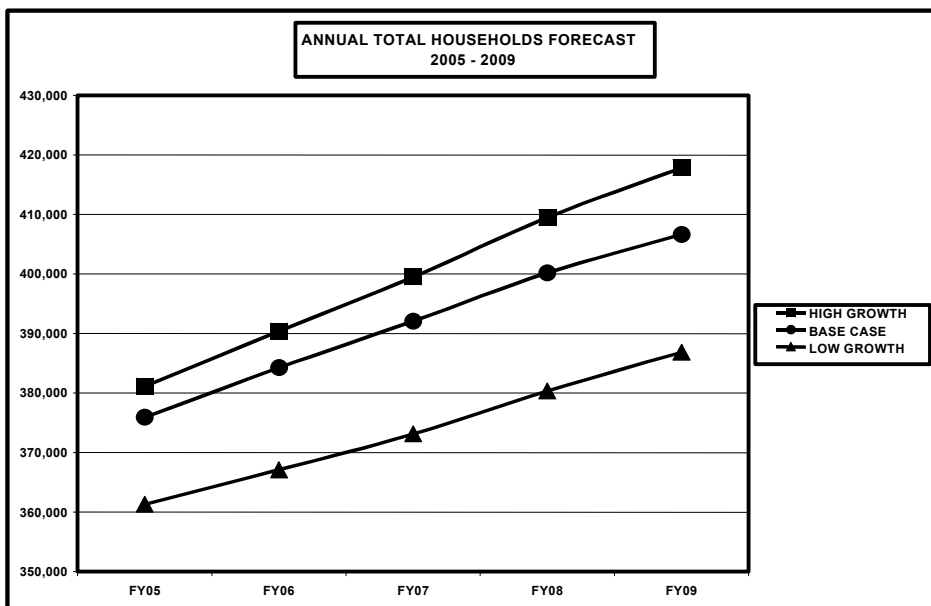
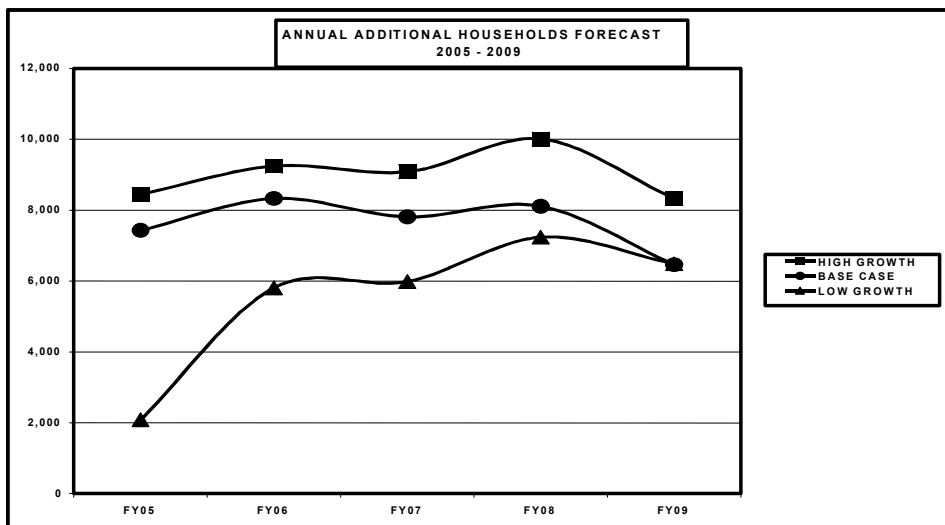
During the 1970s, Idaho experienced a strong 3.9% annual average rate of household formation. At the same time the national rate of household growth was 2.2% per year. In the decade of the 1980s, a period of slower economic and population growth in Idaho, the state's rate of household formation slowed to a 1.1% annual rate, while the nation posted 1.7% annual gains. From 1990 to 2000 Idaho households increased by nearly 2.6% per year – producing an absolute gain of nearly 104,000.

In High Growth Scenario of the 2003 Economic Forecast, the number of households in Idaho is predicted to increase at an annual average rate of 2.1% per year, yielding an absolute increase of 226,000 households in the 2001 to 2020 period. As with the High Growth Scenario population forecast nearly 80% of that population growth is projected to occur in southern Idaho with the Intermountain Gas Company service area.

In Low Growth Scenario, the number of households in Idaho is predicted to increase at an annual average compound rate of 1.3% per year, yielding a modest absolute increase of nearly 134,000 households during

the 2001 to 2020 period. And still, expectations are that slightly over 80% of the Low Scenarios; projected household gains will occur in southern Idaho.

The following graphs illustrate the relationship between the three economic scenarios for the annual total households forecast and the annual additional households forecast for the IGC service territory counties.



## Market Share Rates

IGC utilizes market penetration rates that vary across the service territory. These regional penetration rates are applied to the IGC service-territory counties within the three specific regions: west, central, and east. These penetration rates are the ratio of IGC's additional residential new construction customers to the total building permits in those regions. Forecast additional households multiplied by the regional market penetration rate equals the anticipated residential new construction customers.

IGC derives the regional market penetration rates by dividing the fiscal year regional residential new construction sales total by the number of regional residential building permits compiled by the Wells Fargo Bank Construction Report ("Wells Report"). The Wells Report arranges the data by city, as well as unincorporated portions of the more populous counties in Idaho. These city/county tallies are reconciled to IGC's residential sales by IGC's company town codes for valid comparison, and are then collapsed to the county level.

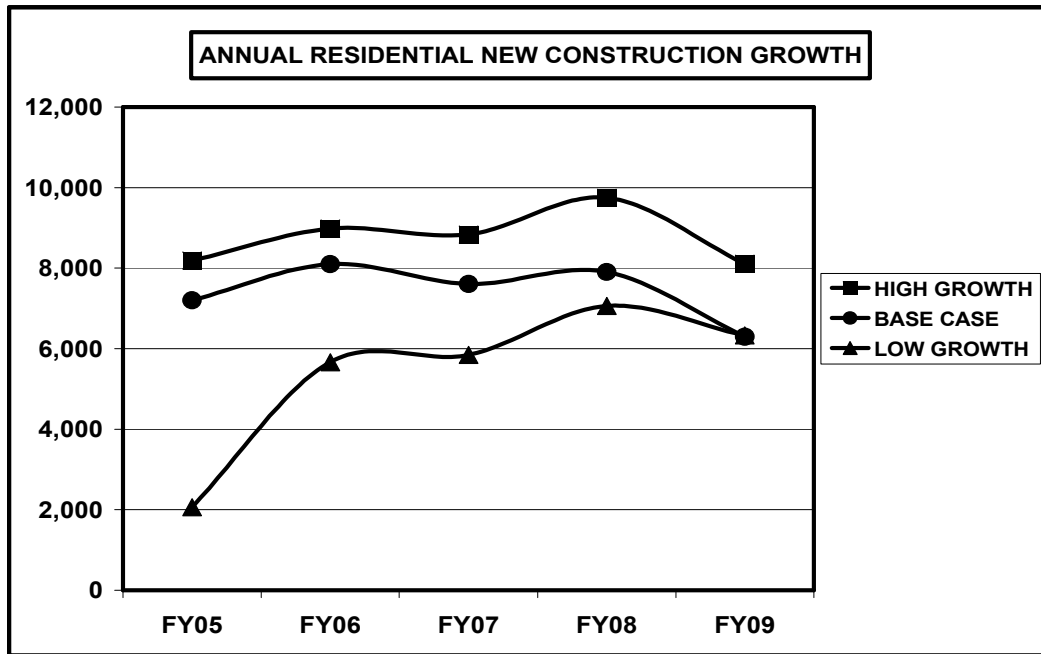
IGC also develops another market penetration rate by way of the county construction reports which IGC marketing and construction personnel use in prospecting for new construction customers. Again, as above, the residential new construction sales in the specific areas covered by these reports are divided by the total dwellings listed in these reports, to derive the market penetration rate. The areas covered here are the major population centers in the IGC Service Territory: Ada/Canyon County, Twin Falls/Wood River Valley, Pocatello/Soda Springs, and Idaho Falls/Rexburg. These market penetration rates are derived month by month, and are compared and reconciled to the market penetration rates derived using the Wells Report.

The market penetration rates used in the customer forecasting varied somewhat when going into the future out of anticipated market share gains in the Central and Eastern regions. Those for the West remained relatively static through the forecast period, since they are already near 100%. The same set of market penetration rates was used in the base case, high growth, and low growth scenarios.

### MARKET PENETRATION RATES

	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>
Western Region	99%	99%	99%	99%	99%
Central Region	95%	95%	95%	95%	95%
Eastern Division	90%	92%	92%	94%	94%

The following graph illustrates the relationship between the three economic scenarios for the annual residential new construction growth forecast for 2005 – 2009:



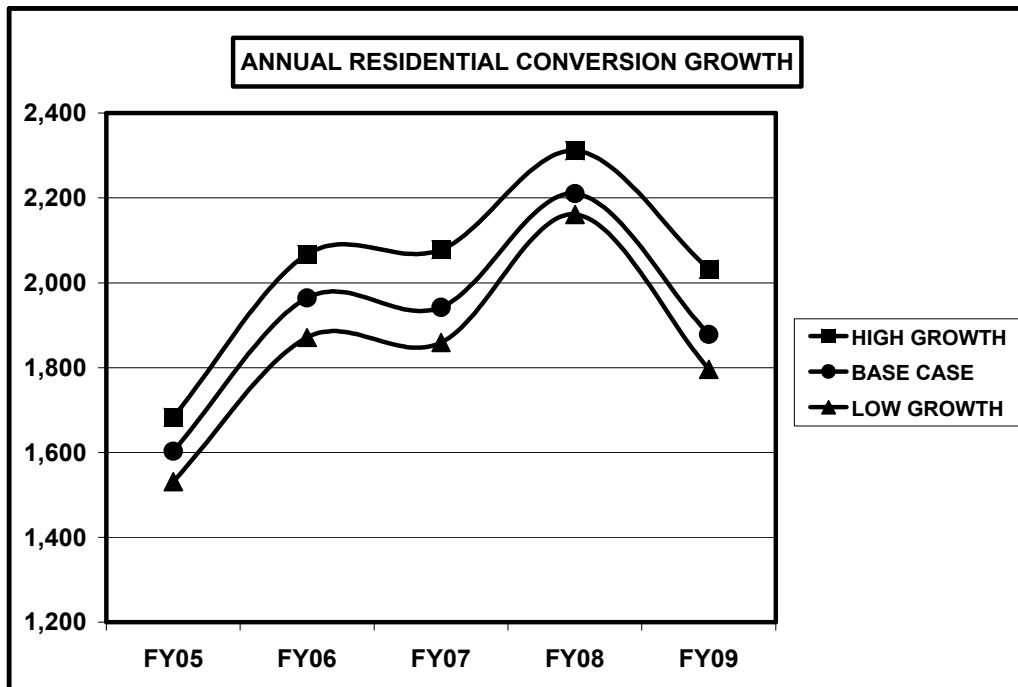
## Conversions

The conversion market represents another source of customer growth. IGC acquires these customers when the homeowner replaces an electric, oil, coal, wood, or other alternate fuel source furnace/water heater with a natural gas unit. IGC forecasts these customer additions by applying regional conversion rates based on historical data and future expectations. During a high and low growth scenarios, the rates are adjusted to maintain reasonable expectations within the context of those alternative economic climates. The following table shows, by region the assumed conversion rates over the five-year period. These rates represent the percentage of new construction additions which will be conversions.

### REGIONAL CONVERSION RATES

	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>
Western Region					
Base Case	17%	19%	21%	23%	25%
High Growth	15%	18%	19%	19%	21%
Low Growth	40%	25%	25%	25%	23%
Central Region					
Base Case	37%	38%	39%	40%	41%
High Growth	34%	34%	35%	35%	35%
Low Growth	130%	65%	60%	45%	42%
Eastern Division					
Base Case	36%	37%	38%	45%	45%
High Growth	35%	35%	35%	32%	32%
Low Growth	36%	55%	55%	43%	40%

The following graph illustrates the relationship between the three economic scenarios for the annual residential conversion growth forecast for 2005 – 2009:



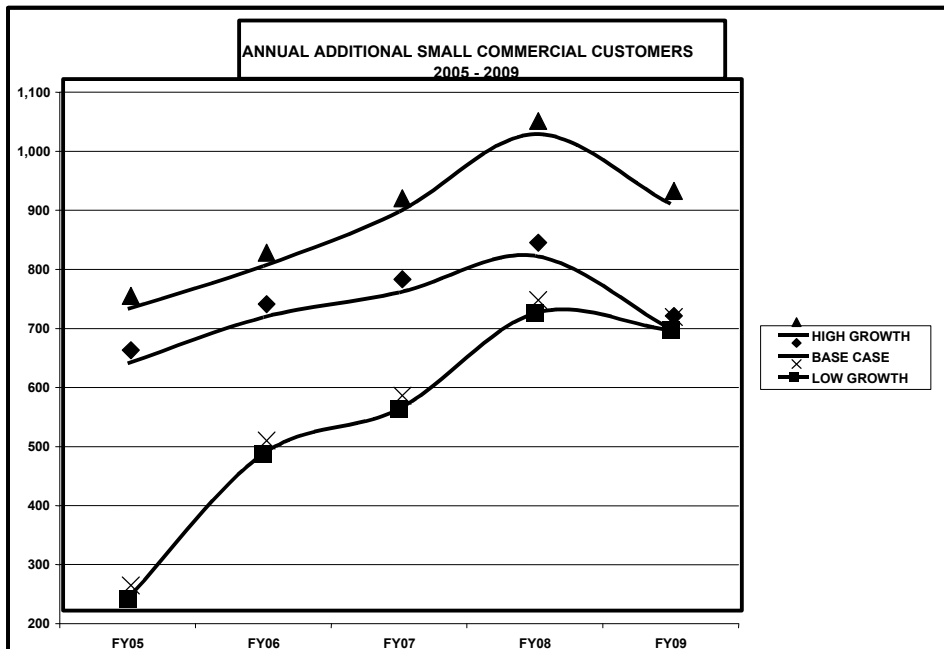
### Small Commercial Customers

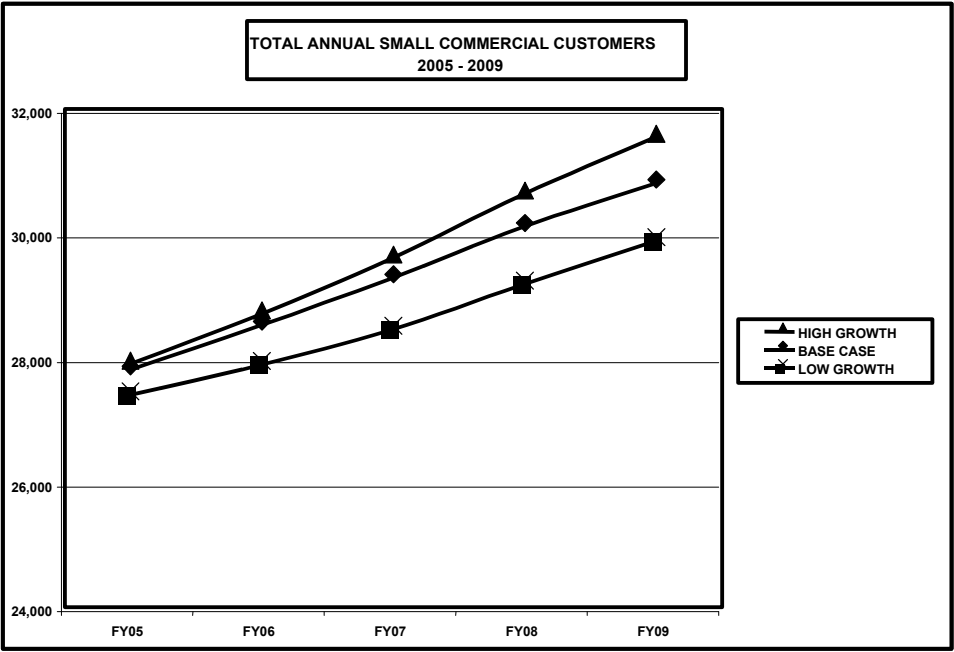
Small commercial customer growth is forecast as a certain proportion of new construction customer additions. The logic being that as household growth drives the major proportion of IGC's residential customer growth, household growth therefore drives small commercial customer growth. New households require additional new businesses to serve them. Based on recent IGC sales data, this ratio of small commercial customer growth to new construction residential varies across the IGC system, and thus different regional rates for small commercial customer growth are used, and are as follows:

REGIONAL SMALL COMMERCIAL CUSTOMER TO RESIDENTIAL NEW CONSTRUCTION CUSTOMER  
GROWTH RATIOS

	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>
Western Region					
Base Case	7%	7%	8%	8%	9%
High Growth	7%	7%	8%	8%	9%
Low Growth	7%	7%	8%	8%	9%
Central Region					
Base Case	12%	11%	15%	15%	15%
High Growth	12%	11%	15%	15%	15%
Low Growth	12%	11%	15%	15%	15%
Eastern Division					
Base Case	15%	15%	16%	16%	16%
High Growth	15%	15%	16%	16%	16%
Low Growth	15%	15%	16%	16%	16%

The following graphs show the annual additional, as well as the annual total small commercial customers for the period 2005 – 2009:







## INDUSTRIAL FORECAST

### Introduction

A survey of the industrial customers served by Intermountain Gas Company was completed in the Spring of 2003, to determine each customer's projected natural gas usage. The survey included a cover letter explaining the intent of the requested information with the assurance that all responses would remain confidential. The survey form was sent to the management of each of Intermountain's 114 large volume contract customers and identified their historical usage on an annual peak month and peak day basis for the past two years ending 2003. This information helped provide a basis for each customer to determine their future natural gas requirements. Additional information was requested as to each customer's alternative fuel capabilities and if there was a desire for additional service options from Intermountain.

The results of the survey was used to forecast three distinct and separate large volume customer forecasts (High Demand, Base Case and Low Growth) for a six year period, commencing in 2004. The projections incorporate information from the customer's management, engineers and marketing personnel regarding plant expansion or modification, equipment replacement and anticipated product demand. Other forecast data was then utilized to adjust the survey data base for two of the three forecasts (Base Case and Low Growth). The 114 customers were further refined into six separate sub-groupings comprised of:

- Seventeen potato processors
- Forty other food processors which include sugar, milk, beef and seed companies
- Four chemical and fertilizer companies
- Twenty light manufacturing companies including electronics, paper and asphalt companies
- Twenty schools and hospitals and
- Thirteen other companies

All customer were assumed to remain on their current tariff while all new customers, if less than 500,000 therms, were assumed to be an LV-1 Customer and those over 500,000 annual therms would be T-4.

### High Demand Forecast

The High Demand, or most optimistic forecast figures incorporate usage data directly from the survey with minor adjustments. The increase from the 2005 annual usage of 226,994,368 therms was projected to increase 35,426,964 therms, or 3.7 % through the forecasted period of FY 2009. The table below summarizes the changes over this period:

High Demand Forecast by Market Segment (Therms)						
	FY 05	FY 06	FY 07	FY 08	FY 09	Compound Rate of Growth
Potato Processors	86,261,000	88,148,000	89,836,000	90,720,000	94,138,000	2.2%
Other Food Processors	65,806,510	66,342,510	67,130,510	67,511,510	68,203,510	0.9%
Chemical & Fertilizer	28,810,000	28,810,000	28,360,000	27,960,000	27,960,000	-0.7%
Manufacturers	19,431,655	18,854,000	19,376,000	19,394,000	19,601,000	0.2%
Institutions	11,829,353	12,402,074	12,485,501	13,509,139	13,572,992	3.5%
Other	14,855,850	38,725,430	38,539,030	38,831,630	38,945,830	27.2%
Total High Demand Forecast Therm Sales	226,994,368	253,282,014	255,727,041	257,926,279	262,421,332	3.7%

- A. Potato production and consumption was projected to return to the FY01 level, the highest usage for this group in the past four years. This level would steadily increase from the FY05 projection of 86,261,000 therms, reaching the maximum in FY09 with an increase of 7,877,000 therms or 2.2%. This assumes that oil prices would not impact the projected usage and no new plants are built, other than those currently in operation.
- B. Other Food processors were projected to increase with the addition of four new customers in FY 05, 06 and 08. The anticipated customers included a malt plant, a seed processor, and two existing small food processors who are expanding their usage above 200,000 therms. All increases by this group, as projected by the individual customer surveys, were included. The total projected increase was 2,397,000 therms, or 0.9% over the 2005 projection of 65,806,510 therms.
- C. The Chemical/Fertilizer group is projected to decrease 850,000 therms from the FY05 projection of 28,810,000 therms or 0.7%. The forecast projects the shut down of a customer's facility in FY08 and expansion of one of the four customers in this group. The projection assumes imported fertilizers will not further erode this groups gas usage over the six year period.
- D. The Manufacturing Group was increased a total of 169,345 therms, or 0.2% from the FY05 projected usage of 19,431,655 therms. This is due to the closing of two plants and a projected addition of a new manufacturing facilities in FY05 of 400,000 therms and another in FY 09 of 200,000 therms.
- E. The Institutional group which is made up of Schools and Hospitals was projected by the survey to increase 1,743,639 therms or 3.5% over the five year period from the FY05 volume of 11,829,353 therms. The prime reason for the increase is due to additional buildings being built, including the continuing expansion of BYU Idaho.
- F. The Other group was anticipated to increase 24,089,980 therms from the 05 usage of 14,855,850 therms or 27.2%. The most significant increase is due to the projected installation of a electrical generator in FY06.

### Base Case Forecast

The projected scenario was based upon the survey and assumed the agriculture economy will return to the previous production in the near future. Additional adjustments were made in the late fall to reflect known changes of existing customers. The projected usage for the Base Case increased 29,863,964 therms, or 3.2% from the FY05 forecast.

Base Case Forecast by Market Segment (Therms)						
	FY 05	FY 06	FY 07	FY 08	FY 09	Compound Rate of Growth
Potato Processors	83,348,000	84,927,000	84,957,000	85,289,000	85,322,000	0.6%
Other Food Processors	65,166,510	64,842,510	66,630,510	66,811,510	67,703,510	1.0%
Chemical & Fertilizer	28,810,000	28,810,000	28,360,000	27,960,000	27,960,000	(0.7%)
Manufacturers	19,031,655	18,854,000	19,376,000	19,394,000	19,401,000	0.5%
Institutions	11,829,353	12,402,074	12,485,501	13,509,139	13,572,992	3.5%
Other	14,855,850	14,215,430	14,539,030	38,831,630	38,945,830	27.2%
Total Base Case Forecast Therm Sales	223,041,368	225,561,014	226,348,041	251,795,279	252,905,332	3.2%

- A. The Potato Processing Group was projected to increase 1,974,000 therms or an increase of 0.6% from a usage of 83,348,000 therms in FY05. The forecasted yearly usage declined in the first several years due to; 1) the assumption that the general demand for processed potatoes would remain low,

- 2) the assumption that the price of natural gas would remain higher than alternate fuel oil and the continued oil usage by 3 customers, 3) the closure of JR Simplot in FY04.
- B. Other Food Processors is projected to increase 2,537,000 therms, or 1.0% from 65,166,510 therms. The primary reason for the increase is due to a new malting plant, a cattle feeding operations and 2 small food processors coming on line in the Fiscal years of 05, 06 and 09. All other customers forecasted a small increase over the 5 year period.
- C. The Chemical /Fertilizer Group is projected to decline 850,000 therms from the FY05 projection of 28,810,000 therms, or 0.7%. The reason for the decline is due to one customer shutting their plant down in fiscal 08 while one customer is forecasted to increase gas usage approximately 30%. The forecast assumes imported fertilizers will not further erode this group over the next six years.
- D. The Manufacturing Group was projected to increase 369,345 therms or 0.5% from the projected usage in FY05 of 19,031,655 therms. This is due to a concrete manufacturing plant shutting down and the closure of a cattle feeding facility in FY05. On the positive side a new manufacturing (electronics) plant is projected to startup in FY06.
- E. The Institutional Group is projected to increase 1,743,639 therms or 3.5% from FY05 through FY09. The increase, per the survey, was due to new buildings for schools and hospitals being built.
- F. The Other Group is projected to increase from 14,855,850 therms or 27.2% primarily due to the projection of an Electrical generator being brought on line in FY08. Several customers projected a declining usage due to the addition of up-dating their equipment.

### Low Growth Scenario

The projected usage for this scenario is based upon the assumption that the overall economy will be weaker with lower natural gas sales due to the continued higher cost of gas and the general agriculture economy remaining less than favorable. The change for the Low Growth Scenario is a total increase of 1,623,964 therms, or 0.2%, as shown below.

Low Growth Forecast by Market Segment (Therms)						
	FY 05	FY 06	FY 07	FY 08	FY 09	Compound Rate of Growth
Potato Processors	82,298,000	82,527,000	82,557,000	82,889,000	82,922,000	0.2%
Other Food Processors	64,736,510	64,482,510	64,740,510	64,091,510	64,783,510	0.0%
Chemical & Fertilizer	28,810,000	28,810,000	28,360,000	27,960,000	27,960,000	-0.7%
Manufacturers	19,431,655	18,854,000	19,376,000	19,394,000	19,401,000	0.0%
Institutions	11,829,353	12,402,074	12,485,501	13,509,139	13,572,992	3.5%
Other	14,855,850	14,725,430	14,539,030	14,831,630	14,945,830	0.2%
Total Low Growth Forecast Therm Sales	221,961,368	221,801,014	222,058,041	222,675,279	223,585,332	0.2%

- A. Potato Processors; The price of natural gas was assumed to continue to be higher than the delivered price of oil, resulting in the lowest gas usage for the potato processing group in the past four years, which occurred in FY02. Additionally, the general potato consumption was assumed to remain depressed over the next five years, and gradually returning in the sixth year, or FY09. This group increased 624,000 therms, or 0.2%, from the projected usage of 82,409,600 therms in FY05. This included the shut-down of the JR Simplot Heyburn facility in FY04 and a reduction by several processors.

- B. Other Food Processors: This Group was projected to increase 47,000 therms. The milk processors were held to their current projections after FY05, based upon the assumption existing siting restrictions will further limit any new dairy milking facilities. Also the sugar industry will decline 10% each year beginning in FY05 through FY09, as the price of natural gas increases against the delivered price of coal. All other customers were held to their projected usage.
- C. The Chemical / Fertilizer group was projected to decrease 850,000 therms from the FY05 projection of 28,810,000 therms or 0.7%. The forecast projects the shut down of a customer's facility in FY08 and an increase of approximately 30% of one of the four customers in this group. The projection assumes imported fertilizers will not further erode this groups gas usage over the six year period.
- D. The Manufacturing Group was projected to decline 30,655 therms from the projected usage of 19,431,655 in FY05. This is due to a concrete manufacturing plant shutting down and the closure of a cattle feeding facility in FY05. On the positive side a new manufacturing plant is projected to startup in FY06.
- E. The Institutional Group is projected to increase 1,743,639 therms, or 3.5% from FY05 through FY09. The increase, per the survey was due to new buildings for schools and hospitals being built during the forecasted period.
- F. The Other Group is projected to increase from 14,855,850 therms, or 89,980 therms, or 0.2% due primarily to customer projections of upgrading their equipment.

**Firm Contract Demand:**

The survey requested information as to each customer's future peak requirements along with their forecasted annual usage. In discussing this issue with many of the largest customers, their peak day may not increase, but their off peak day requirements would, i.e. less week-end downtime. The individual customer's peak day requirements will be used to analyze potential future upgrades to existing laterals serving each community. The existing and any new customer's Maximum Daily Firm Quantity (MDFQ) for each of the Large Volume Firm Services (LV-1), Firm Transportation Service (T-1) and the Firm Transportation Service with Maximum Daily Demand (T-2) will not be increased over the projected period. This is due to the recognition or decision that the incremental firm transportation capacity, as contracted with Williams Pipeline Company, would create additional cost to all customers. Additionally, each of the three tariff services, as listed above, are limited to annual usage less than 500,000 therms per year. The current peak day firm therm requirements or demand for the large volume contract customers by type of service are as follows:

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<u>Tariff</u>	<u>Total Firm Daily Demand Requirements (Therms)</u>
Large Volume Firm Sales Services (LV-1)	16,825
Firm Transportation Services (T-1)	138,897
Firm Transportation Service with Maximum Daily Demand (T-2)	<u>55,070</u>
Total	210,792

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## **SAMPLE OF SURVEY COVER LETTER**

April 27, 2001

customer name  
address  
city, state, zip

Re: customer name

Dear \_\_\_\_\_

In order to meet your future natural gas needs, we will need a projection of your future incremental requirements on an annual, monthly, and peak day basis. To assist in your projection, we have included historical usage information for the prior two years (beginning in January 1999) on the enclosed survey form.

The increasing natural gas usage that has taken place over the past five years as a result of the growth in the residential and commercial sector, and the expanding industrial requirements in southern Idaho, has demanded additional emphasis on forecasting our customer's future needs. An Order from the Idaho Public Utilities Commission also requires Intermountain Gas Company to document its supply and demand forecasting efforts as an added assurance that we are meeting our customer's needs at the lowest system cost consistent with supply reliability.

We want to re-emphasize our commitment to continue reliable firm large volume sales and firm transportation services to you as a valued customer of Intermountain Gas Company.

We appreciate your busy schedule and the effort required to complete this survey. However, only with your assistance will we be able to accurately plan for the future to continue to provide you with the highest quality service. Please return your completed survey, including any comments you have by May 18<sup>th</sup>, 2001. After evaluating the responses, I will contact you concerning our plans for the future.

Should you have any questions, or if I can be of assistance to you, please call me at (208) 377-6053.

Very truly yours,

Daniel A. McAlister  
Industrial Services Manager

DAM/slk

Enclosure

## SAMPLE OF SURVEY FORM

Account Name: \_\_\_\_\_ Account Number: \_\_\_\_\_  
Existing Tariff: \_\_\_\_\_ Daily Contract: \_\_\_\_\_

### Historical Information

Most Recent 24 Months	Annual Usage	Peak Monthly Usage	Date of Peak Month	Peak Day Usage	Date of Peak Day
12 months ended December 31, 2000					
12 months ended December 31, 1999					

### Requested Information - Projected Usage

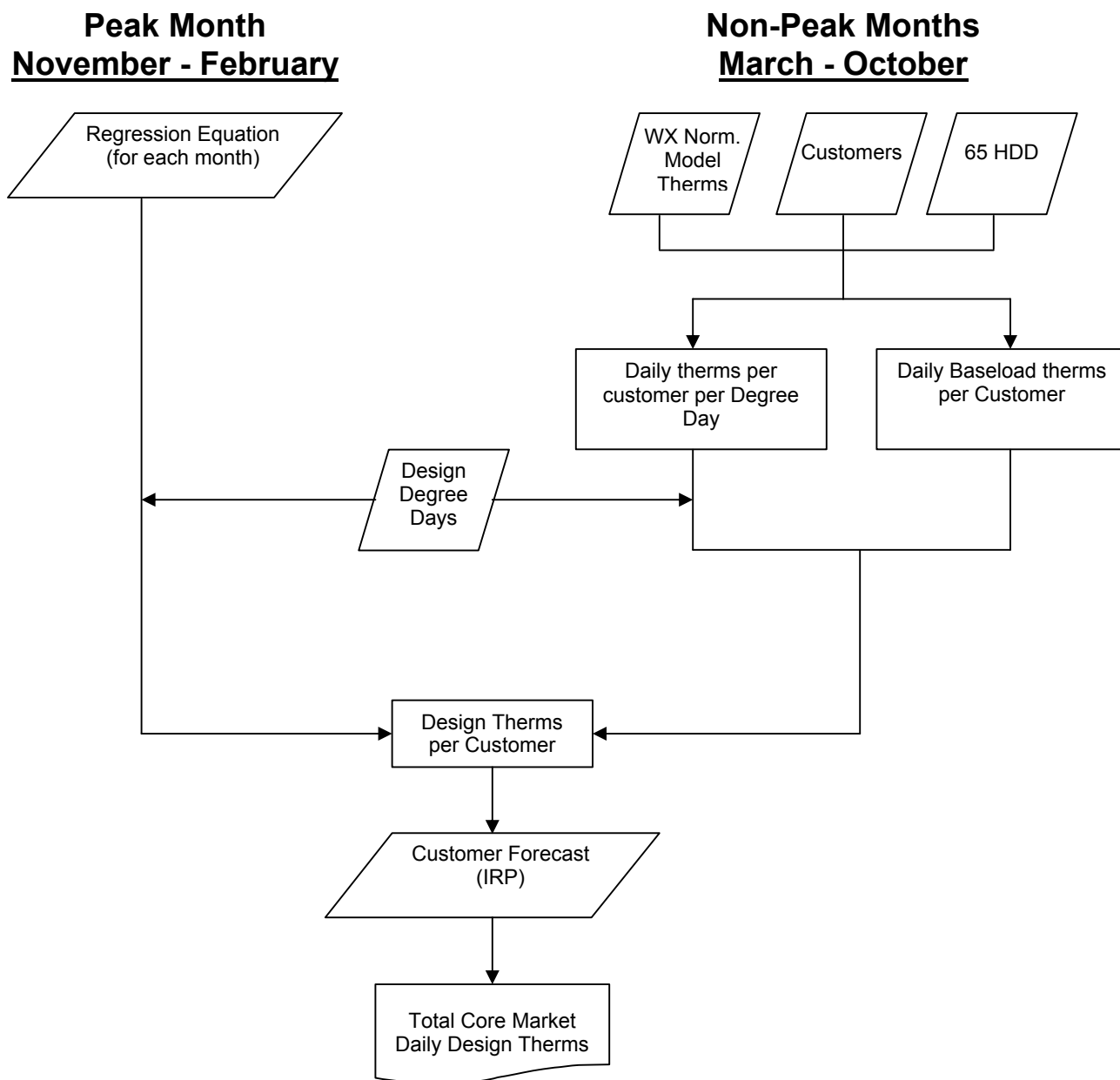
Description (Usage Figures in Therms)	Calendar 2000	Calendar 2001	Calendar 2002	Calendar 2003	Calendar 2004	Calendar 2005	Calendar 2006	Calendar 2007	Calendar 2008
Annual Usage									
Peak Monthly Usage									
Peak Day Usage									
Month of Peak Day									

1. What is the prime reason for the projected change in usage? \_\_\_\_\_
2. What is your existing alternative source of energy? None ☐ Coal ☐ Oil ☐ Other ☐
3. What percent of your current peak day energy needs, served by natural gas, can be served by existing alternative fuel? \_\_\_\_\_%
4. If you do not currently have an alternative energy source, what would be your preference? None ☐ Coal ☐ Oil ☐ Other ☐
5. What additional options would you consider or suggest to enhance your service? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THE INFORMATION PROVIDED ON THIS FORM WILL REMAIN CONFIDENTIAL WITH INTERMOUNTAIN GAS COMPANY

## USAGE PER CUSTOMER UNDER DESIGN DEGREE DAYS

This section of the Intermountain Gas Company (IGC) Integrated Resource Plan (IRP) describes and summarizes the usage per customer calculation under design weather conditions. These results, combined with the customer forecast results, develop the load duration curve for the IRP. The following flowchart illustrates the development of daily residential and small commercial market therms utilizing design degree-days.



The following sections more fully explore the derivation of the usage per customer assumptions during peak months and non-peak months. Both sections discuss the respective methods used to calculate usage per customer per degree day and the application of the resulting equations.

## CUSTOMER USAGE DURING PEAK MONTHS

### Data and Variables

Usage per customer per degree-day under design weather is based upon a multiple regression equation for each month during the peak heating season of November through February.

The dependent variable, peak usage per customer, is calculated by dividing the total residential and small commercial market sendout for each day during each of the peak months by total residential and small commercial customers for each day during each of the peak months. Daily customers are developed by evenly spreading the difference between the customers at the beginning of the month and the customers at the end of the month to the days of the month.

A thirteen-year historical database, using data from the winter of 1989/1990 through the winter of 2002/2003, was used to develop the dependent variable (See Exhibit 3, Appendix A). A starting point of 1989 was selected for the database, because of a structural shift that has occurred in the data. During the late 1980's and early 1990's, the effects of tighter Federal and State equipment efficiency standards and new building codes, which incorporate higher efficiency standards, have led to a decrease in usage per customer per degree day (See "The Efficient Use of Natural Gas"). In addition, the rapid customer growth of the 1990's means that an increasing percentage of the customer base is using this more efficient equipment. As a result of this change in usage per customer, models using the 1989/90 through 2002/03 data provided a much better statistical fit than models that included the older data.

The independent variables consist of the actual sixty-five heating degree-days (65HDD) for each day during the peak months and a weekend binary variable. The weekend binary variable, a one (1) if Saturday or Sunday, and a zero (0) if Monday through Friday, helps establish whether or not a relationship exists between usage and the weekend.

### Methodology and Results

A regression equation was developed for each of the peak months. The independent variables, daily actual 65HDD and weekend binary, were regressed against the dependent variable, daily usage per customer, to detect any relationship between the dependent and the independent variables (See Exhibit 3, Appendix B). The weekend binary variable was not significant in the February model, so the 65HDD variable is the only variable remaining in the February model. The models for November, December and January all include both the 65HDD variable and the weekend binary variable.

In order to evaluate models, two statistical measurements were employed: the adjusted  $R^2$  and the F-statistic. The adjusted  $R^2$  determines what percent of the variability in usage is explained by the independent variables. The F-statistic determines whether or not the regression equation is significant. A table of the adjusted  $R^2$  and the F-statistic follow:

PEAK-DAY USAGE REGRESSION EQUATION RESULTS		
MONTH	ADJUSTED $R^2$	F-STATISTIC
NOVEMBER	89.0%	1700.04
DECEMBER	89.3%	1806.74
JANUARY	88.0%	1581.24
FEBRUARY	61.6%	587.95



After the regression equations were developed, design degree-days were used in the models in place of actual 65HDD to calculate the daily usage per customer during the peak months. (See Exhibit 3, Appendix C-E).

### Customer Usage During Non-Peak Months

Customer usage during the non-peak heating months of March through October is based upon an average usage calculation from Intermountain's weather normalization model. First, baseload usage was removed from the monthly usage per customer. Baseload usage is defined as the usage during July and August, which is 24.0 therms per month. The remaining monthly therm usage from the weather normalization model was then divided by customers and 65HDD to develop daily usage per customer per degree-day. The following table shows the therms per customer per degree-day for each of the non-peak heating months.

USAGE PER CUSTOMER DURING NON-PEAK MONTHS	
MONTH	THERMS/CUSTOMER/65HDD
MARCH	0.148
APRIL	0.128
MAY	0.102
JUNE	0.086
JULY	0.000
AUGUST	0.000
SEPTEMBER	0.092
OCTOBER	0.091

The daily usage per customer per degree day figure was then multiplied by the design degree days resulting in weather sensitive usage per customer. Daily baseload usage was added to the weather sensitive usage per customer to arrive at total usage per customer, under design weather conditions, for each of the non-peak heating months.

### Total Daily Usage

The usage per customer for both peak and non-peak periods was then multiplied by the total residential and small commercial customers for that day (See Customer Forecast). This calculation results in total usage for each day.

Total daily usage for each month varied depending upon the customer growth assumption that was used (i.e. low growth, baseline, or high growth) (See Exhibit 3, Appendix C-E).

### Usage by Customer by Geographic Area

Intermountain Gas Company has recently installed additional meters on targeted areas of its system that measure natural gas throughput in addition to the existing pressure measurement. These new meters, located on the Idaho Falls and Sun Valley Laterals, will facilitate a more geographically specific correlation between consumption and Heating Degree Days ("HDD's") thereby refining the usage forecasts for these laterals.

## DESIGN HEATING DEGREE DAYS<sup>2</sup>

Intermountain Gas Company uses the demand forecast to determine and plan for future annual and peak day firm capacity requirement. The design degree-days provide a means to distribute the heat sensitive (core)<sup>3</sup> load portion of the forecast on a daily basis. See Design Degree-Days by Month on Table #1.

### Design Development

A review of the last thirty years' of heating degree data from NOAA<sup>4</sup> (see Tables #2 and #3 for Degree-Day data) was made to determine the limits of a design year. Due to their geographic locations, data from the Boise and Pocatello weather stations was used to represent the total distribution system's design degree-days. The review revealed Intermountain's coldest twelve consecutive months to be the fiscal year 1985 (October 1994 through September 1995). This period, with certain modifications, represents the basis for the design.

### Design Modification

The coldest month for the last thirty years was December 1985 (1638 degree-day). For design purposes, December 1985 was substituted for January (peak month).

The addition of degree-days to the remaining non-peak months (one percent) to assume the potential for colder weather.

The summer months (May through September) were normalized.

The total design was made to assume a bell-shaped curve with peak at mid-January (see Graph #1). This ensures a core peak to coincide with the peak industrial load that historically occurs in mid-January.

### Design Peak Day Modification

The coldest day on record occurred on December 22, 1990 and was an 82 degree day average for Boise and Pocatello (i.e. Boise 82 degree day and Pocatello 81 degree day). For design purpose, an 84-degree day was used to reflect colder temperatures that have occurred in eastern Idaho. The average of the two reporting stations is representative of the temperature extremes that may be expected in each location throughout Intermountain Gas Company's service area. Additionally, although the peak day occurred in December, it was assumed the peak day would occur in January for planning purposes.

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<sup>2</sup> The methodology was reviewed and approved by Idaho Climatologist Myron Molnow, Moscow, Idaho

<sup>3</sup> The core market (heat sensitive) usage per customer as determined by the regression correlation analysis is multiplied by the design degree days to determine daily usage.

<sup>4</sup> NOAA - National Oceanic and Atmospheric Administration

**HEATING DEGREE DAYS - NORMAL/ ACTUAL FY 85/DESIGN**

<u>Month</u>	<u>Weighted Normal (30 yrs)</u>	<u>Actual Fiscal 1985</u>	<u>Design - Bell Shaped Curve</u>
October	452	605	524
November	818	834	907
December	1129	1350	1332 <sup>2</sup>
January	1166	1512	1638 <sup>2</sup>
February	884	1196	1210 <sup>2</sup>
March	723	1026	963
April	484	435	585
May	248	236	296
June	39	69	99
July	0	0	7
August	0	35	25
September	<u>99</u>	<u>288</u>	<u>176</u>
Total Year	6042 <sup>3</sup>	7586	7762 <sup>1</sup>

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The resultant Degree Day Design compares to: (See graph on Page 32)

- 1 27.8% colder than normal year; 2.3% colder than the 1984/85 year
- 2 3.0% colder than the 1984-85 three month period December through February (critical planning months due to pipeline capacity restraint and rationing of storage gas)
- 3 Weighted 30 year normal ending FY2003

Table #2

#2

HEATING DEGREE DAYS Base 65 deg. F BOISE, IDAHO													
SEASON	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1965-66	7	20	234	285	613	1075	1004	881	630	467	192	57	5317
1966-67	7	18	68	476	654	1039	843	742	707	627	379	79	5581
1967-68	0	0	49	434	723	1146	1092	688	346	553	232	59	5566
1968-69	0	39	119	382	684	948	945	797	639	432	147	75	5247
1969-70	3	13	91	535	751	905	886	639	724	631	249	79	5405
1970-71	0	0	240	537	650	909	958	765	763	485	176	78	5601
1971-72	10	6	210	492	753	1089	1047	813	598	543	194	45	5782
1972-73	11	0	222	406	727	1270	1056	708	673	470	182	91	5816
1973-74	4	13	103	342	692	817	1099	728	687	452	304	42	5323
1974-75	10	11	58	301	689	983	1132	732	721	607	275	76	5730
1975-76	6	21	74	399	759	1093	1013	836	838	524	189	132	5896
1976-77	3	24	76	434	720	1097	1418	868	772	342	358	7	6191
1977-78	8	32	145	362	756	852	859	744	500	438	329	74	5132
1978-79	5	33	178	370	841	1171	1503	855	665	431	241	72	6413
1979-80	5	2	76	326	901	899	1070	725	736	367	257	153	5402
1980-81	0	41	104	409	790	980	957	783	631	432	315	97	5502
1981-82	15	5	137	497	624	915	1240	974	720	586	312	85	6129
1982-83	27	2	182	432	863	1030	897	633	622	530	369	81	5639
1983-84	36	0	145	332	682	1290	1350	1004	710	565	328	163	6616
1984-85	0	6	204	557	771	1299	1412	1093	895	398	226	53	6916
1985-86	0	26	258	309	1113	1610	1097	668	522	499	280	15	6607
1986-87	33	2	259	376	733	1141	1149	781	639	287	140	41	5563
1987-88	23	18	86	306	732	990	1195	780	666	359	261	59	5638
1988-89	4	5	152	178	734	1169	1242	1166	656	356	276	30	5953
1989-90	0	29	97	421	789	1064	951	858	633	303	286	82	5653
1990-91	6	10	26	430	710	1449	1252	651	676	493	306	100	6109
1991-92	0	0	55	409	822	1026	982	657	492	308	92	54	6197
1992-93	6	40	118	340	907	1124	1239	1004	715	501	140	155	6289
1993-94	33	45	124	367	960	975	994	839	579	378	143	64	5525
1994-95	9	1	34	440	967	1066							

COOLING DEGREE DAYS Base 65 deg. F BOISE, IDAHO													
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1969	0	0	0	0	32	121	256	251	75	0	0	0	735
1970	0	0	0	0	24	201	357	341	30	0	0	0	953
1971	0	0	0	0	31	81	320	435	42	2	0	0	913
1972	0	0	0	0	62	129	255	303	40	0	0	0	817
1973	0	0	0	0	51	177	341	269	51	1	0	0	890
1974	0	0	0	0	13	252	289	236	71	0	0	0	851
1975	0	0	0	0	10	64	426	182	96	11	0	0	789
1976	0	0	0	0	19	66	263	150	55	2	0	0	535
1977	0	0	0	0	10	170	255	306	61	0	0	0	822
1978	0	0	1	0	6	64	254	203	72	0	0	0	397
1979	0	0	0	0	27	129	293	199	101	3	0	0	752
1980	0	0	0	3	25	68	251	117	38	2	0	0	504
1981	0	0	0	1	3	52	205	295	101	0	0	0	659
1982	0	0	0	0	2	117	194	248	50	0	0	0	611
1983	0	0	0	0	55	30	180	313	26	0	0	0	624
1984	0	0	0	0	19	70	291	340	64	2	0	0	786
1985	0	0	0	2	28	125	402	165	4	0	0	0	726
1986	0	0	0	1	103	235	184	346	57	0	0	0	908
1987	0	0	0	23	61	202	225	180	111	0	0	0	800
1988	0	0	0	4	46	237	308	245	65	24	0	0	896
1989	0	0	0	6	14	140	376	191	56	0	0	0	783
1990	0	0	0	3	5	145	357	293	180	6	0	0	909
1991	0	0	0	0	0	36	339	363	85	0	0	0	832
1992	0	0	0	13	76	202	308	321	77	20	0	0	915
1993	0	0	0	0	84	63	182	71	8	0	0	0	456
1994	0	0	0	15	30	136	386	354	96	0	0	0	1029

Source: National Oceanic and Atmospheric Administration

Table #3

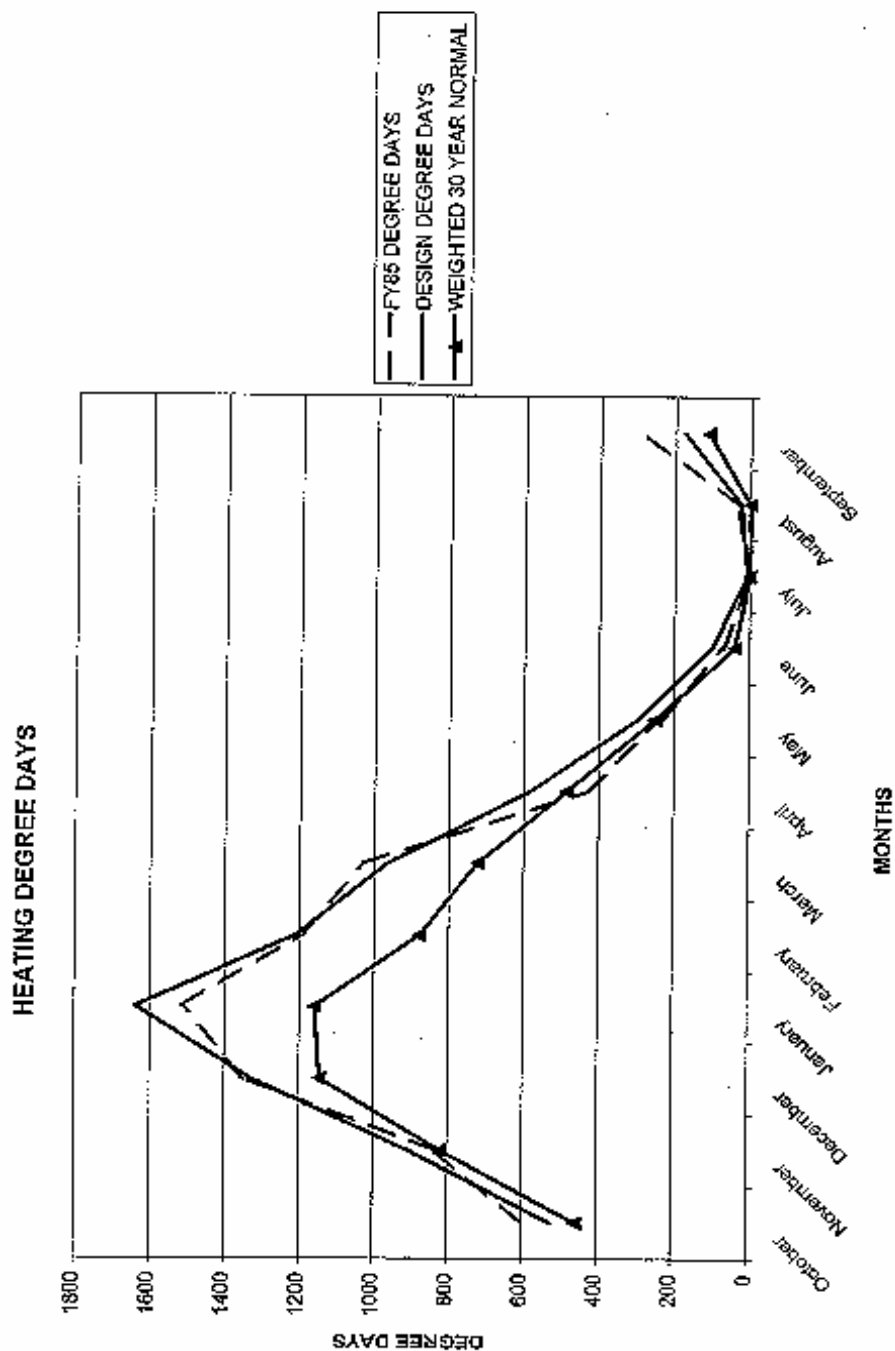
#3

HEATING DEGREE DAYS Base 65 deg. F. POCAHELLO, IDAHO												
SEASON	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1965-66	10	60	393	440	725	1216	1211	1092	861	618	253	140
1966-67	2	26	133	623	612	1263	1063	858	845	720	372	178
1967-68	6	3	128	345	585	1398	1352	921	783	689	405	154
1968-69	9	143	260	381	742	1240	1105	1094	1104	594	323	167
1969-70	24	17	105	465	873	1124	1060	772	868	771	346	141
1970-71	4	2	333	675	817	1236	1166	1014	997	666	376	168
1971-72	19	13	374	664	964	1308	1300	1039	735	654	346	191
1972-73	30	9	281	527	860	1445	1394	1077	895	643	290	135
1973-74	12	18	237	500	843	1089	1313	979	815	560	359	78
1974-75	12	42	173	500	639	1246	1312	1021	908	743	435	122
1975-76	12	40	168	521	943	1001	1172	1026	999	615	219	140
1976-77	1	34	163	561	611	1127	1475	1043	926	465	406	6
1977-78	1	38	189	447	831	950	1043	875	678	567	431	119
1978-79	10	39	241	473	960	1387	1073	1054	857	623	320	136
1979-80	1	10	64	422	1050	1400	1245	876	668	507	413	184
1980-81	5	37	182	576	890	1026	1125	988	801	516	407	127
1981-82	16	9	130	603	800	1031	1382	1161	834	703	406	159
1982-83	36	0	216	607	987	1227	1029	863	760	675	415	141
1983-84	61	3	163	478	854	1392	1461	1291	949	658	335	205
1984-85	5	7	221	643	897	1400	1612	1398	1157	472	246	85
1985-86	0	44	321	597	1143	1657	1281	816	656	592	389	35
1986-87	28	5	326	519	884	1247	1410	875	762	398	231	64
1987-88	46	31	144	445	854	1203	1343	926	643	485	340	38
1988-89	1	3	220	293	888	1330	1408	1292	870	480	365	113
1989-90	0	47	159	556	831	1183	1079	1022	766	438	389	139
1990-91	3	20	53	576	813	1255	1406	786	813	610	425	132
1991-92	3	1	176	533	950	1182	1201	776	630	407	154	97
1992-93	23	63	175	417	1078	1233	1445	1240	890	612	256	216
1993-94	135	69	219	530	1115	1200	1003	999	734	492	207	90
1994-95	17	5	100	539	1038	1208						

COOLING DEGREE DAYS Base 65 deg. F. POCAHELLO, IDAHO												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1969	0	0	0	0	15	23	177	195	25	0	0	0
1970	0	0	0	0	0	91	197	230	4	0	0	0
1971	0	0	0	0	0	29	146	212	9	0	0	0
1972	0	0	0	0	7	26	150	152	6	0	0	0
1973	0	0	0	0	7	94	174	174	14	0	0	0
1974	0	0	0	0	1	190	215	162	12	0	0	0
1975	0	0	0	0	2	23	260	95	23	4	0	0
1976	0	0	0	0	1	46	227	70	28	0	0	0
1977	0	0	0	0	1	129	150	164	35	0	0	0
1978	0	0	0	0	0	28	177	123	41	0	0	0
1979	0	0	0	0	0	64	207	145	63	0	0	0
1980	0	0	0	3	0	17	125	70	6	0	0	0
1981	0	0	0	0	0	36	143	232	34	0	0	0
1982	0	0	0	0	2	48	155	187	16	0	0	0
1983	0	0	0	0	4	19	131	199	25	0	0	0
1984	0	0	0	0	15	33	168	178	27	0	0	0
1985	0	0	0	0	5	65	257	90	3	0	0	0
1986	0	0	0	0	17	110	100	185	4	0	0	0
1987	0	0	0	0	6	74	154	194	23	0	0	0
1988	0	0	0	0	8	181	123	123	25	0	0	0
1989	0	0	0	1	4	34	255	169	10	0	0	0
1990	0	0	0	0	0	68	194	152	29	0	0	0
1991	0	0	0	0	0	12	192	237	32	0	0	0
1992	0	0	0	0	15	73	103	213	51	2	0	0
1993	0	0	0	0	3	16	24	57	2	1	0	0
1994	0	0	0	1	4	78	195	228	29	0	0	0

Source: National Oceanic and Atmospheric Administration

## HEATING DEGREE DAY



## **TRADITIONAL SUPPLY SIDE RESOURCES**

### **Overview**

Traditional supply resources are those that the Company normally uses on a day-in and day-out basis to deliver natural gas to its customers. More specifically it is the natural gas supply – or the commodity – the end-user burns, the physical pipe through which the gas moves to reach the end-user, and certain storage facilities where natural gas is stored for use in high peak periods. Intermountain's gas supply management strategy involves meeting all firm customer gas and/or transportation requirements while minimizing costs and associated risk by utilizing a portfolio of diverse supply resource options. The following section will identify and discuss each of the available supply resources and describe how each part may be utilized in a larger portfolio approach to gas delivery management.

### **Background/Historical Perspective**

Natural gas is a naturally occurring mixture of hydrocarbon gases found in geologic formations under ground. It is principally methane and is produced by drilling into porous formations and extracting the hydrocarbons using various techniques. The procurement and distribution of natural gas is in concept a straightforward process. It simply follows the movement of gas from its original geological source through processing, gathering and pipeline systems to end-use facilities where the gas is ultimately ignited and converted into thermal energy. Intermountain physically receives all gas supply to its distribution system via citygate taps with Northwest Pipeline ("NWP"), the only interstate pipeline with interconnects to Intermountain's system.

A predecessor of NWP first brought natural gas service to the Pacific Northwest in the mid 1950's by constructing pipeline facilities which began in Northwestern New Mexico and Southwestern Colorado and continued Northward through Utah into Southern Idaho, then across Idaho, Eastern Oregon and Western Washington. The pipeline then turned Northward up the I-5 corridor where it interconnected with Duke Energy Gas Transmission ("DEGT" - formerly Westcoast Pipeline), a Canadian pipeline in British Columbia, near Sumas, Washington (See Exhibit 4, Appendix A). Along its path, NWP also interconnects with National Gas Transmission ("NGT" - formerly PGT) near Stanfield, OR as well as several other interstate and gathering systems in Wyoming, Utah, Colorado and New Mexico. From those interconnects, Northwest receives gas supplies from the gas producing regions in Alberta, British Columbia, Northwest Territories and the Rocky Mountain region of the Western U.S. for delivery to utilities and other end-use customers located both on and off its system.

Delivery of natural gas supply to end-use markets in the Pacific Northwest has evolved significantly in the past 15 years. Up until the mid 1980's, the typical gas Local Distribution Company ("LDC") or utility, merely "ordered" a certain quantity of natural gas each day from its local interstate pipeline company. The pipeline was responsible for contracting with producers for the natural gas supply, managing the daily gas supply and arranging for all required upstream pipeline capacity.

Under this strictly controlled and regulated environment, the natural gas industry in the late 1970's and early 1980's began to experience a decline in overall demand, particularly in the industrial market segment, as the end-use market responded to gas prices which were artificially high vis-à-vis other energy alternatives. At the same time, the Federal Energy Commission's ("FERC") practice of setting high wellhead prices to ensure adequate levels of reserve replacement discouraged producers from efficiently managing production and deliverability. High prices encouraged producers to continue to add to the growing supply surplus even though, in reality, no market existed for gas at the regulated prices set by FERC. Additionally, the pipeline grid was inefficient so when peak demand periods did occur, no mechanism existed (i.e. a spot market) to move the surplus, uncontracted-for supply to end-use markets.

The result was capacity curtailments that were interpreted by the market as supply shortages. This mixed bag of confusing economic signals was one of the key factors that led the Federal government to determine that only a free and competitive marketplace could solve the problems then facing the gas industry.

## **Deregulation**

Before the introduction of deregulation its policies, FERC strictly regulated all aspects of the interstate gas delivery system including wellhead pricing, transport capacity, storage utilization and delivered-to-the-citygate pipeline prices. Consequently, Intermountain simply reserved peak day delivered requirements from NWP, "nominated" the level of expected demand for any given gas day, and paid NWP the tariff price for the level of bundled services utilized. There existed no way for Intermountain to negotiate better prices, adjust its portfolio to meet changing market conditions or temporarily sell off under-utilized "resources". Nor was any LDC capable of planning for and executing a gas supply plan specific to its own needs to ensure it could serve and satisfy its customers.

Beginning in the mid-1980's, FERC began the process of leading the natural gas industry into a more competitive environment by first decontrolling wellhead natural gas prices. Then FERC began to decouple the interstate pipeline's control on contracting for and purchasing natural gas from its physical capacity to move the gas. The goal was to allow the market to not only price the natural gas, but also to turn natural gas into a true commodity. Secondly, pipeline capacity and storage facilities needed to be provided to users in a competitive, open-access environment. Armed with Congressional authority to introduce competitive market forces into the interstate natural gas marketplace, FERC began to issue a series of Orders to deregulate the natural gas market. Exhibit 4, Appendix A, Table 1 lists and describes some of the more significant legislative actions and events which resulted in today's decontrolled and deregulated gas industry, as well as several of the ensuing FERC Orders by which these policy directives and laws were implemented.

While yesterday's natural gas market was often constrained and gas supplies were often under produced and over priced, today's competitive energy environment allows market signals to encourage capacity enhancements. Producers are now driven by economic pricing signals to increase drilling and exploration for natural gas and the interstate pipeline grid has grown so that capacity is less localized and the gas producing regions in the U.S. and Canada are now a part of a larger, more efficient system. For example, where much of the gas supply produced near the facilities of NWP was historically captive in the Pacific Northwest – having no outlet to other regions – new pipeline construction and expansions have created additional avenues for delivery into off-system regions from California to the Midwest. The benefit to Intermountain is that producers are encouraged to continue enhancing deliverability.

Another benefit of deregulation is an increase in overall pipeline grid efficiency as gas supplies can move quickly through once impassable capacity barriers, across vast regions to serve locations with the highest demands. Within the producing areas, the only difference in natural gas pricing is the variable cost of transportation between production points. While this new efficiency has led to new market growth for natural gas, it has also lead to more competition among the Western and Midwestern U.S. markets for available gas supplies, driving up prices in the Northwest generally. Gas producers now have more ability to send gas supplies to markets willing to pay higher prices.

Another more localized effect is a higher annual load factor (the annual average throughput divided by peak throughput) on NWP as deregulation has led to higher throughput. Consequently, the more efficient use of capacity at times results in less operational flexibility for shippers and may interesting enough, result in less frequent expansions by pipeline companies as needed capacity may be found via capacity release. This deregulation phenomenon has placed Intermountain in a mega-regional marketplace where market conditions from Western Canada and California to the Gulf of Mexico or Chicago, may affect the regional market dynamics relating to supply availability, pipeline capacity and commodity pricing signals.

Today's LDC is responsible to structure, arrange and manage its own gas supply and transportation portfolio in order to meet the needs of its customers. As interstate pipelines are now only common-carrier transporters



and no longer contract for gas supply, it is up to the individual LDC to properly plan and implement strategies to ensure the availability of the necessary resources.

While the gas delivery environment has changed drastically in the past decade, Intermountain's commitment to providing secure, reliable and price-competitive firm service to its customers has not. Whether the customer desires burner-tip sales service, transport-only service or other unbundled service options, Intermountain will, through its long-term planning process, continue to identify, analyze and utilize best-practice strategies and implement procedures necessary to provide the value of service that its customers expect.

## Gas Supply

**General.** Intermountain is well positioned in a region with a diverse and stable gas supply base as the Rockies and Western Canadian Sedimentary Basin ("WCSB") producing fields continue to provide ample production and deliverability. Historically, the PNW has enjoyed an advantage of low cost natural gas because supply basins in this region were not well connected to the larger North American market. With capacity additions to the interstate pipeline grid, this advantage has all but disappeared as we now compete for gas supply with the broader national market. This new market efficiency has resulted in sustained higher prices for this region as we now must compete with markets traditionally paying higher prices for gas supply (See Exhibit No. 4, Chart 4.1).

The sustained higher market prices of recent years has once again peaked interest in the supply potential from the Arctic regions of Alaska and Canada specifically in the Prudhoe Bay and Mackenzie Delta regions. However, any deliveries from these basins will require a huge investment in new pipeline capacity, will take years to complete and will require a long and difficult permitting process. As such, even the most optimistic expectations push the initial deliveries of this potential gas supply well out of the term of this study.

Liquefied Natural Gas ("LNG") imports are another supply source is currently generating much interest in the marketplace. Most of this supply will come from foreign production and would be shipped in huge tankers to receiving ports along the coast line of the U.S. While the North American market already imports some LNG today, its overall impact to the market is nominal. However, some studies indicate that if today's prices levels are sustainable, LNG imports will continue to increase and within 20 years may equal nearly 10% of annual gas usage. But as with the Arctic gas supply, the huge investment required to build port facilities as well as perceived safety issues and the lengthy permitting process, make significant imports of LNG during this forecast period unlikely.

A significant change in most forecasts show increased pricing for the Pacific Northwest reflecting new pipeline capacity in the Western U.S. and Canada which allow more gas supply to flow to the historically higher priced markets in the Midwest and East coast. While prices are projected to remain robust, availability is not expected to be an issue. Even during the high prices of 2000 and 2001, gas was available as long as a market was willing to pay the market price. As well, issues relating to gas-fired generation, storage, hydro-generation and gas-to-electric price spreads that plagued the market during the past few years appear to be less critical as the competitive market adjusts for these factors.

**Types and Pricing.** During the early years of Open Access, Intermountain determined that a portfolio based on firm supply contracts with a variety of reputable suppliers would provide the greatest level of reliability and security for year-round delivery of gas supply. Firm supply (as opposed to best efforts or interruptible) is sold with a supplier's assurance that, absent a defined *force majeure* event, 100% of the supply will be available for delivery to the market on every day of the contract term.

The NYMEX natural gas futures provide the market with an excellent price discovery tool. Using the NYMEX natural gas contract and/or associated derivative pricing has allowed Intermountain more flexibility in the way it builds the portfolio. As well, stringent creditworthiness requirements, by financial institutions, give buyers and sellers more confidence as to the financial viability of their contractual counterparties, notwithstanding of length of the contracts. Because both buyers and sellers are generally unwilling to take unnecessary price,

credit or market risk, the amount of gas traded with prices based on NYMEX-type financial instruments continues to account for the majority of supply bought and sold.

One key element of term supply pricing is Load Factor. A producer is typically more willing to offer supply under a high load factor contract. In fact, it has become increasingly difficult to purchase firm supply at anything less than 100% load factor. Under such a contract, the supplier knows that absent any force majeure event, the market will take the full volume of gas every day during the term of the contract. Alternatively, under a less than 100% load factor contract, the market may only take gas during the peak periods and release the supply to the supplier during lower usage periods when pricing is usually less advantageous for the seller. Therefore, the supplier must stand prepared to re-market the unutilized supply when the term market does not require it - often times at short notice and during periods when spot pricing is relatively low. For this reason, suppliers normally require a premium to the market price or a demand charge when contracting with low load factor markets. The load factor concept is an important consideration of portfolio management as Intermountain seeks to obtain the most cost efficient supplies available.

Intermountain also utilizes other types of supply such as daily and/or monthly spot, seasonal supply, swing and winter peaking. A recent addition to the portfolio is citygate deliveries. This supply source is simply where a marketer bundles gas supply with interstate capacity and delivers supply directly to the LDC. The Company also uses storage facilities to balance its loads and achieve an efficient supply portfolio (See Page 43, "Storage").

Long-term supply has historically been priced at a premium to spot or index-based supply. In today's market, most buyers and sellers rely on the market index prices at various pricing points plus or minus a premium for each given month. Using Nymex futures, either party is able to lock-in prices for future periods should those prices meet the party's requirements.

Spot gas is typically gas that suppliers, for various reasons, do not contract on a term delivery basis. The term "spot gas" may apply to gas sold under differing terms including firm, interruptible, swing, day gas or best efforts and is usually available at almost anytime at varying volumes, prices and contract terms. Spot gas may be bought for one or several days a time, for one month or even for seasonal periods such as the summer injection periods. During peak usage periods, spot may be difficult to find, be relatively expensive, unreliable or may be available only on a day-to-day basis. Of course in non-peak months, spot is most often readily found and is usually less expensive compared to firm supply. Intermountain generally purchases firm spot supplies for a given month and as a rule, targets those suppliers with reputation for reliability.

Swing supply is gas that is very interruptible. Swing is most often utilized early in the winter periods in order to preserve storage or during times when the loss of that supply would not result in curtailments to customers. Swing is most often available during significant weather swings and is often the cheapest gas that can be purchased due to its interruptible nature, but it can play an important role in a diversified portfolio.

Winter peaking supply is typically baseload volume purchased for the two-to-four winter peak usage months to augment the storage withdrawal cycle. While these contracts may be structured in any number of ways, they are ordinarily firm in nature and have 100% daily take commitments but often have price levels that exceed month-to-month spot.

**Supply Regions.** Intermountain's natural gas supplies are located primarily in three producing regions: British Columbia (BC) Canada, Alberta, Canada and the Rocky Mountain (or Domestic) region consisting of production primarily from the states of Wyoming, Utah, Colorado and New Mexico. In general, the proportion of purchases from the various supply basins is very dependent upon the mix of firm receipt capacity on the various pipelines utilized (see "Transportation" below).

**British Columbia.** BC has traditionally been a source of abundant supply for the Pacific Northwest. Much of the gas produced in the province is exported into the U.S. at an international interconnect point located near Sumas, WA. Much of that supply had historically been somewhat captive to the region due to the lack of alternative pipeline options into Eastern Canada or the Midwest U.S. However, the expansion of

TransCanada Pipeline's capacity into Eastern Canada and the completion of the Alliance pipeline delivering supply into the Chicago area, eliminated that bottleneck.

While there continues to be an adequate supply from BC over and above provincial demand, new discoveries in Northeast BC and the Northwest Territories are critical to future deliverability to export markets. Even though these supplies must be transported long distances in Canada and over an international border, there have historically been few political or operational constraints to encumber the delivery to Intermountain's citygates. Recent deliverability studies by DEGT project moderate growth in reserves and future production.

**Alberta.** Production in this province has always been abundant. In fact, Alberta is believed to have the largest natural gas reserves in the North American continent and annually produces 10 times the Pacific Northwest's yearly consumption. Since a 1993 National Gas Transmission ("NGT" formerly PGT) expansion that increased the delivery of Alberta supply into NWP, Alberta supply continues to have importance within Intermountain's portfolio. The Stanfield interconnect between NWP and NGT offers added operational reliability and flexibility over other receipts points both north and south. Other positive factors influencing the decision to purchase Alberta supplies are vast unrecovered reserves, extensive pipeline facilities, and access to inexpensive production-based storage (see "Storage" below). Where these supplies once amounted to a trickle, today's purchases amount to approximately 37 percent of the Company's peak purchases.

One area of concern is the rapid production decline of wells drilled in the past few years. In response to the price increases in 2000 and 2001, record numbers of rigs were drilling in Alberta. A large number of these new well completions were in shallow reservoirs which produced huge amounts of natural gas early on, but then declined rapidly. However, regions that are expected to be the next frontier for future exploration and production are in basins requiring deeper well depths. These deeper wells generally do not have the robust early production of the shallower wells but neither do they have the steep production decline curve and therefore produce gas, at steadier rates, for much longer periods. However, drilling deeper wells also involves greater cost. Again, as long as the producer can achieve adequate returns on investment, exploration, drilling and increased production will continue.

Most recent reserve and production forecasts for Alberta are mixed in projections; some see increases and others decreases. A recent Canadian National Energy Board (NEB) study projected that the Western Canadian Sedimentary Basin ("WCSB") has 266 Tcf of Ultimate Resource Potential, most located in Alberta. However, Alberta is also considered a mature basin and other studies indicate that over the medium term, producing entities' plans for drilling and production may not replace natural declines in production. However, new gas fields in Northern British Columbia and the southern areas of the Northwest Territories and the Yukon indicate significant potential new supply pools likely exist and expectations are positive. In general, it is projected that, at worst, any loss of Alberta production will be offset by increases in BC production. While the short-run supply availability from Alberta may tighten somewhat, longer-term forecasts project marginally increasing production.

Additionally, the northern most pipeline facilities in Alberta are well positioned to receive supply from the Arctic regions should exploration and production commence in those basins.

**Rockies (Domestic).** Domestic supply has historically been the second largest source of supply for Intermountain partly due to NWP requirements (see "Transportation") but also because the supplies have been readily available, relatively inexpensive and highly reliable. Events such as NWP's expansions at interconnects with off-system pipelines (e.g. Kern River) and the general effect of the deregulated and competitive marketplace has tended to make supply in this region more price competitive with Midwestern and California markets and consequently, more expensive than in the past.

Due to recent successful reserve finds, particularly in the Rockies tight sands and coalbed methane producing basins, gas production in the region is projected to grow by 14% from 2004 to 2008. This growth should provide ample gas supply availability throughout this forecast. However, recent experience indicates that the traditional "gas bubble" of excess supply that was so prevalent in the 1990's, is no longer a reality. While the unprecedented price increases during 2000 and 2001 and the subsequent price strengthening in 2003 and 2004 were the result of many factors, clearly overall demand growth has exceeded supply growth

over the latter part of the 1990's and through 2004. But it is also apparent that the exploration and production community can bring additional supplies to market quickly if prices are high enough to encourage adequate investment.

Forecast production figures indicate that the Rockies have 233 tcf of ultimate production potential. The Rockies' basins are the only producing area in the lower 48 that are projected to show increased production in the next decade. There are a few caveats however. First, domestic producers find it increasing difficult to gain access to new areas to explore for natural gas. And it is also becoming more of an effort to obtain permits from various governmental entities which greatly slows down the drilling process. But as long as these concerns are appropriately addressed, free-market forces should continue to spur future exploration in the Rocky Mountain regions. Additionally, with the help of new technologies, the Rockies should continue to provide ample gas production for the region well into the future.

One area of concern is the NWP capacity constraint at Kemmerer, Wyoming (just east of the Idaho border) which limits the amount of Rockies supply that can flow west into Idaho during peak periods. Taking advantage of "segmentation" opportunities on NWP, the Company increased its allocation of firm capacity rights from receipt domestic points flowing through the Kemmerer bottleneck into Idaho. This provided Intermountain with the capacity necessary to transport Clay Basin withdrawals into Idaho. Because the cost of physically increasing capacity through the Kemmerer constraint point would be exorbitant, the Company will likely not increase its stake in Rockies supply unless additional released capacity can be obtained through another firm shipper on NWP. Near-term outlooks project that the Company will continue to obtain approximately 42 percent of its peak gas supply from the Rockies. (See Exhibit No. 5, Appendix B for Supply Resource Summary.)

## Transportation

**General.** Firm transportation capacity provides a mechanism whereby a pipeline will, on behalf of a designated and approved shipper, reserve the right to receive and redeliver a certain amount of gas supplies on that pipeline system to a specified delivery point. The major pipelines with which NWP interconnects can be seen on Exhibit 4, Appendix A. Duke Energy Gas Pipeline (formerly Westcoast Transmission) in British Columbia interconnects with NWP near Sumas, Washington and provides for the receipt of supplies produced in BC as well as the Northwest Territories. An interconnect with Duke Energy Gas Transmission ("DEGT" formerly PGT) near Stanfield, Oregon allows for the delivery of gas produced in Alberta into NWP. Other major interconnects are with Colorado Interstate Gas in Southwestern Wyoming; Questar Pipeline in Western Colorado and Eastern Utah; and El Paso Pipeline in Southwestern Colorado and Northern New Mexico. These pipelines provide outlets for gas produced in locations stretching from Wyoming to New Mexico. NWP also directly interconnects with producing and/or gathering areas in Wyoming, Utah, Colorado and New Mexico.

**Deregulation.** All activity regarding transportation of natural gas supplies through any part of the interstate pipeline grid continues to be under the review and regulatory oversight of FERC. The final step in the deregulation process required pipelines to discontinue sales service and open the interstate transportation grid to competition. Thus the pipelines' former sales customers were directed to convert their sales entitlements to firm transport capacity.

One of the more significant actions was FERC Order 636 which generally completed the task of providing a more open and competitive marketplace by unbundling pipelines' gas purchasing obligation from their transportation function. As a result, pipelines became common carrier transporters and no longer sold bundled supplies. All shippers were compelled to provide their own supply and any shipper with unneeded capacity could release it in the open market via the pipeline's electronic bulletin boards ("EBB") or websites. Therefore, any entity seeking new or incremental space on an interstate pipeline could potentially have access to unused space through the capacity release mechanism. Other significant features of Order 636 were Straight-Fixed-Variable ("SFV") rate design, open market access to storage and Hub services, flexible receipt and delivery point nominations and the shifting of system balancing responsibility from the pipeline to the shippers and end-use customers.

Another important feature of Order 636 allowed firm shippers to “release” unutilized capacity to others in the marketplace who would willingly pay the market price to lease it for some predetermined period of time. This allows Intermountain the opportunity to sell off unused capacity in off-peak and also to obtain additional capacity if the need were to arise. A valuable offshoot of capacity release is the notion of “segmentation”. This is a particular kind of release where the primary path can be divided into two or more separate pieces along the receipt/delivery path where each piece still retains its applicable primary firm rights. Segmented capacity allows Intermountain to segment one or more of the pieces of that capacity to be released to a replacement shipper while retaining a segment for its own use. The amount the replacement shipper pays for the “new” capacity is a cost savings to the releasing, or original, shipper. Intermountain has completed several long-term segmented releases that enable the Company to retain the same level of overall firm capacity while also obtaining a significant cost savings which are passed on to Intermountain’s customers.

The decoupling of capacity was critical in the unbundling process as natural gas molecules – or the commodity - at any given supply point has little value unless a sufficient amount of transport capacity is also available to effectuate delivery of the molecules to the end-use burnertip. As well, a party with firm transport capacity but inadequate supply arrangements could find itself unable to use the capacity. Consequently, firm natural gas supply and firm transport capacity must be utilized together to offer secure and reliable delivery of natural gas to an end-use market’s burnertip. Clearly, possession of one without the other will in all probability result in less than firm service and in all likelihood, increases the risk of supply failure.

As a condition of sales CD conversion, NWP required that shippers continue to source purchases in the same proportion that the pipeline had sourced its sales portfolio: Approximately 58 percent of daily supply was required to be sourced from Sumas to ensure the efficient operations of the pipeline. However, past experience with NWP system dynamics has shown that any type of disruption due to normal maintenance, extreme weather conditions or basin price variations, tend to result in pro-rata transport cuts and Operational Flow requirements. This operational dissonance is particularly onerous for markets East of the corridor as it most often occurs with South-flow supply from Sumas through the I-5 corridor.

Intermountain actively searched for ways to minimize these problems. One alternative was to move existing receipt capacity or find new capacity at alternative points. Intermountain discovered there were also certain transportation cost benefits to moving firm receipt capacity away from Sumas by using segmentation opportunities. Consequently, Intermountain elected to “segment”, or move just over half of its firm receipt capacity on Northwest from Sumas to Stanfield. This reduced its reliance on the amount of BC supply purchased, from 58 percent of peak purchases in the late 1980’s, to approximately 22 percent today and added a new level of diversity to the gas supply portfolio.

From the earliest days of deregulation, Intermountain fully embraced the idea of the efficiencies of the competitive marketplace and consequently was the first Pacific Northwest LDC to convert 100% of its applicable sales CD to transport capacity. When NWP implemented Order 636 on its system in 1994, the Company had already been transporting 100% of its supply for six years. Intermountain was also the first LDC in the Northwest to implement transportation tariffs behind its own citygates in order to allow its industrial customers to benefit from the advantage of open access transportation.

The table below shows Intermountain's receipt point capacity through 2009 from each receipt area on the NWP system. Through studies such as this, Intermountain reviews its capacity requirements and adjusts its resources as needed.

**Intermountain Gas Company  
Firm Receipt Point Capacity Through 2009  
Volumes in MMBtu**

<b>Receipt Point</b>	<b><u>2004</u></b>	<b><u>2005</u></b>	<b><u>2006</u></b>	<b><u>2007</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>
<b>Sumas</b>	41,146	41,146	41,146	41,146	41,146	41,146
<b>Stanfield</b>	76,800	86,800	86,800	86,800	86,800	86,800
<b>Rockies</b>	87,384	93,384	93,384	93,384	93,384	93,384
<b>Storage</b>	87,000	87,000	87,000	87,000	94,500	94,500
<b>Citygate</b>	<u>25,000</u>	<u>25,000</u>	<u>25,000</u>	<u>25,000</u>	<u>25,000</u>	<u>25,000</u>
<b>Total</b>	<u>317,330</u>	<u>333,330</u>	<u>333,330</u>	<u>333,330</u>	<u>340,830</u>	<u>340,830</u>

The Company utilizes this transport capacity to move purchased supplies to the citygate taps with NWP. Gas is then moved from these various points through its own distribution system to provide various types of delivery service to its customers. Residential and small commercial ("Core") customers currently may receive only sales service while the smaller of the large volume industrial customers may also elect the same.

Intermountain provides both interstate and distribution transport services to its industrial customers in its service territory through the use of its pipeline contracts and/or distribution system. For Intermountain's firm T-1 and T-2 customers, the customer's gas is received at the NWP mainline, transported on the Company's interstate capacity and distribution system and then redelivered to the customers' facilities. The Company also transports gas for customers only on its distribution system. Under its T-4 tariff where the customer delivers supply to one of Intermountain's applicable citygates and that supply is then redelivered on a firm basis to the customer's facilities via the Company's distribution facilities. The Company also has a T-3 tariff which provides for interruptible distribution on the distribution system.

Intermountain has actively managed the utilization of its transport capacity through the growth years of the 1990's as projects to build new capacity have largely been either extremely expensive or unavailable to this area requiring the Company to consider several alternatives. In fact, NWP has no current plans for facilities expansion that would provide additional rights to Intermountain. One strategy to forestall the need to purchase new capacity has been to encourage the Company's industrial customers to participate in the open market to procure their own capacity. The Company has also limited growth in the industrial customer's loads under firm agreements and has required new transporters to elect T-4 firm distribution-only transportation service. These strategies have allowed the Company to continue to serve the growing core market while minimizing the need for new pipeline capacity. Intermountain recognizes that growth will eventually dictate the need for additional capacity and consistently evaluates the need for capacity additions.

The Company has one main transmission line in Eastern Idaho that serves customers in the Idaho Falls region. Due to increased customer load in this area, this line has been capacity constrained at times and is one of the resources that the Company monitors closely. Intermountain has also recently identified two other locales that are projected to see capacity constraints in the coming years without capacity additions. The first is the Sun Valley lateral in Central Idaho and the Canyon County area in Western Idaho. All three of these constraint areas and potential solutions to the constraints are addressed in this study.

## Storage Resources

**General.** Storage facilities have been developed to bridge the gap between demand and supply in peak periods. This gap occurs because the demand curve is *not* linear, the supply curve somewhat linear and transport capacity is very linear. Storage helps to balance supply requirements with demand needs while minimizing cost.

To illustrate, Intermountain's load shape is very steep in the winter months and peak demand greatly exceeds maximum transport capacity. This is because it would be prohibitively expensive to obtain enough capacity to supply that last unit of demand that only exists on the peak day(s). Storage facilities are utilized to fill this gap as gas is injected into storage during off-peak periods and then withdrawn during the peak load months. The advantage is two-fold: first, the Company can shave the winter peak off the Demand Curve therefore minimizing transport capacity needs and secondly, injecting gas in off-peak months provides a more efficient year-round utilization of both gas supply and the interstate capacity resource. Additionally, the market often prices off-peak supplies at a discount allowing the Company to better manage its portfolio and its overall WACOG. Storage facilities are normally of two general types: liquefied storage and underground storage.

**Liquefied Storage.** Liquefied storage facilities make use of a process that pressurizes and supercools gaseous methane to approximately minus 260 degrees Fahrenheit until it liquefies. Liquefied natural gas ("LNG") occupies only one-six hundredth the volume compared to its gaseous state and so it is an efficient method for storing peak requirements. However, the liquefaction process is an expensive process and since these facilities are of necessity man-made, the use of large steel tanks, safety equipment and costly compression equipment is required. It typically requires as much as one unit used for liquefaction fuel for every three to four units liquefied. Also, the full liquefaction cycle may take 5 – 6 months to complete. Because of the high cost and length of time involved filling a typical LNG facility, it would normally be cycled only once per year and its use reserved for peaking purposes.

However, the process of changing the liquid back into the gaseous state is an efficient process called vaporization. Since the natural state of methane under typical atmospheric and temperature conditions is gaseous and in fact, lighter than air, and the liquid methane is super-compressed, vaporization requires little energy and will occur naturally under normal conditions. Vaporization of LNG into a system is usually accomplished by utilizing the system pressure differentials through the opening and closing of valves. The high pressure LNG is allowed to push itself into the lower pressure distribution system. Potential LNG daily withdrawal rates are normally large and a typical withdrawal cycle may last less than 10 days at full rate. For this reason, LNG is typically used as "needle" peaking supply and is usually located in market areas.

Intermountain utilizes two such facilities; one is NWP's LS facility located near Plymouth, Washington and the other resides on Intermountain's distribution system near Nampa, Idaho. Neither facility requires the use of existing transportation capacity as the Plymouth facility has bundled transport capacity for redelivery to Intermountain and the LNG tank withdrawals go directly into the Company's distribution system.

**Underground Storage.** This type of facility is typically found in naturally occurring underground reservoirs (e.g. depleted gas formations, salt domes, etc.), aquifers or sometimes in man-made caverns or mine shafts. These facilities often require little hardware compared to LNG and are usually less expensive to build per equivalent volume. In addition, commodity costs of injections and withdrawals are usually minimal by comparison. These lower costs allow the more frequent cycling of inventory; many such entities are utilized to arbitrage changing market prices. Of more significance to Intermountain, the minimal commodity costs make underground storage an ideal tool for winter baseload or for daily load balancing.

Another material difference for liquefied storage is the maximum level of injection and withdrawal. Because underground storage involves far less compression as compared to LNG, daily injection levels are much higher while daily withdrawal maximums are significantly less. Consequently, a typical withdrawal cycle might last 35-60 days or more at maximum withdrawal. For this reason, the Company generally utilizes

underground storage for winter baseload supply; the withdrawal cycle typically lasts from November to mid-March.

Intermountain utilizes three underground storage facilities. The first is Jackson Prairie located near Chehalis, WA and operated by NWP. Another is Questar's Clay Basin facility Northeastern Utah that has a direct connection to NWP. Lastly, the Company utilizes a facility located in Eastern Alberta called "AECO" operated by the Encana. It is connected to the NOVA system and, unlike the other storage sites used by the Company which are market-based, AECO is located near the producing fields of Alberta and does not require the use of Intermountain's interstate capacity to effectuate injections.

Below is a summary of Intermountain's storage capabilities through 2009.

**Intermountain Gas Company  
Storage Capability Through 2009  
Volumes in MMBtu**

Facility	Maximum Capacity	<u>Withdrawal Cycle</u>		<u>Injection Cycle</u>		Redelivery Capacity
		<u>Daily Max</u>	<u>% of Peak</u>	<u>Daily Max</u>	<u>Days</u>	
LNG (Nampa)	580,000	60,000	17%	3,500	166	None
LS	770,520	72,000	21%	4,000	193	TF-2
SGS	1,092,099	15,000	4%	30,337	36	TF-2
Aeco	2,600,000	19,335	5%	26,000	100	TF-1
Clay Basin	5,857,500	48,809	14%	48,809	120	TF-1
Total	10,900,119	215,044	61%	112,646		

**Delivery Capacity.** Both the Plymouth and Jackson Prairie facilities include distinct bundled firm redelivery transport capacity on NWP equal to the daily the withdrawal rights. This enables Intermountain to withdraw and redeliver these volumes without using its annualized firm capacity; however, injections do require the use of interstate capacity. This is advantageous because having storage with its own redelivery capacity allows the Company to minimize its purchase of its daily, or annualized capacity. Of course, this also minimizes the unneeded capacity during the non-peak season.

AECO and Clay Basin are not bundled with transport redelivery capacity. This requires Intermountain to use its already existing annualized capacity on NWP to move withdrawals to the Company's citygate locations. As such, these facilities' inventory is generally withdrawn in a winter baseload fashion. Clay Basin also requires existing capacity for injections, while AECO does not. The LNG facility only requires capacity for injections since it is located on the Company's own system; withdrawals generally occur via pressure differentials and are reserved for the coldest peak periods. Notwithstanding the age of the LNG facility, it is considered to be valuable from the peak demand perspective.

**Summary.** The Company generally utilizes its diverse storage assets to offset winter load requirements, provide peak load protection and, to a lesser extent, for system balancing. Intermountain believes that the geographic and operational diversity of the five facilities utilized offers the Company and its customers a level of efficiency, economics and security not otherwise achievable. Geographic diversity provides security should



pipeline capacity become constrained in one particular area. The lower commodity costs and flexibility of underground storage allows the Company flexibility to determine its best use from alternatives such as winter baseload, peak protection, price arbitrage or system balancing. Because of the high levels of daily withdrawal capacity along with relatively high operating costs, the Company has traditionally used the liquefied inventory facilities (LS and LNG) for needle peaking supply during periods of extreme cold.

### **Supply Resources Summary**

Intermountain utilizes the most efficient mix of the above supply resources to provide reliable, secure, and economic firm service to its customers. The Company is continually reviewing the varying needs of its customer base as well as the changing environment in which it operates. Intermountain actively manages its current mix of resources and is consistently seeking additional resources and techniques to maintain and improve service to its customers. The Company actively monitors natural gas pricing and production trends in order to maintain a secure reliable and price competitive portfolio. Intermountain also seeks innovative techniques to manage its transportation and storage assets in order to provide both economic benefits to the customers and operational efficiencies to its interstate and distribution assets.

## **NON-TRADITIONAL RESOURCES**

Non-traditional resources are defined here as providing additional resources to meet the design peak day load by either decreasing the natural gas load using alternative fuels or increasing capacity within the existing pipeline system. Five (5) such non-traditional resource alternatives were considered and are as follows:

- Fuel Oil
- Propane
- Propane-Air
- Portable LNG Facilities
- Compressor Station

A major contributor to the needle peak are the large volume industrial customers. Large volume industrial customers typically purchase their own firm gas supply as well as interstate transportation to IGC's delivery points and then contract with IGC for firm transportation capacity within IGC's local distribution system. By incorporating the following alternative fuels, where applicable, the system demand needle peak can be significantly reduced.

Fuel oil, propane, propane-air and the LNG facilities were evaluated as alternative fuels used in conjunction with industrial customers during their peak day demand. This form of Demand Side Management in essence reduces peak day demand within the distribution system as industrial customers switch to a particular alternative fuel.

The addition of a compressor station increases the overall capacity of a pipeline system, but does not reduce demand or load during peak usage.

### **Fuel Oil**

Fuel oil is generally restricted to the industrial customers because of the equipment typically used within industrial plants. Switching a boiler load over to oil and leaving the direct fire load on natural gas during peak demand typically reduces the plant load by 50 - 70%. In some situations, some industrial customers have the ability to switch entirely from natural gas to fuel oil. Burning fuel oil in lieu of natural gas does require obtaining various permits from the local governing agencies and can be a lengthy process depending on the specific type of fuel oil.

Capital costs for fuel oil facilities are approximately \$150,000 - \$250,000 providing 10,000 – 20,000 therms per peak day up to eight (8) days. After the eight days, the facilities would then have to be refilled with oil at a cost between \$0.50 - \$1.00 per gallon depending on contractual obligations and time of year. [Note: one gallon of fuel oil is typically 138,000 – 155,000 BTUs, depending on grade and blending]. Fixed operation and maintenance (O&M) costs are approximately \$60,000-\$120,000 per year.

### **Propane**

Since propane is similar to natural gas, the conversion to propane is much easier than a conversion to fuel oil. With the equipment, orifices and burners being similar to that of natural gas, an entire industrial customer load (boiler and direct fire) may be switched to propane. Therefore, utilizing propane on peak demand could reduce an industrial customers' natural gas needs by 100%.

Capital costs for propane facilities are considerably higher than that for fuel oil. Typical capital costs for a peak day send out of 30,000 therms per day are approximately \$500,000 - \$600,000. Such peak day send out is limited to six days after which the facilities would have to be refilled with propane at a cost ranging from \$0.50 - \$1.00 per gallon. [NOTE: One gallon of propane is approximately 92,000 BTUs]. Fixed O&M costs are approximately \$60,000 per year.

## **Propane-Air**

Propane-air facilities were evaluated with the potential of utilizing such facilities in both reducing the large volume industrial customer load and providing additional supply to the core market load within the existing distribution system.

Propane-air facilities used as an alternative fuel within industrial plants to reduce the peak is basically the same as propane, with the exception of even higher capital costs. Such capital costs are approximately \$500,000 - \$700,000 for the same peak day sendout of 30,000 therms with fixed O&M costs of approximately \$120,000 per year.

Using propane-air facilities to provide additional supply within the distribution system to meet the peak day requirements was also evaluated. The same capital and O&M costs would be incurred as with an industrial customer, but typically additional property and siting requirements would be required to locate the propane-air facility near a distribution system. There are several interchangeability concerns brought about by too great a concentration of propane-air when blended with natural gas, all of which can pose service, maintenance and safety problems with unattended appliances.

## **Portable LNG Facilities**

Portable LNG facilities are available for lease from various companies and could be used for peak shaving at industrial plants or within a distribution system. Regulatory and environmental approvals are minimal compared to permanent LNG plants and are dependent upon actual location of the portable LNG facilities. The available delivery pressure from LNG equipment ranges from 50 psig to 350 psig with a peak day sendout of approximately 24,000 th/day per vaporizer.

Fixed costs with one vaporizer and two days of storage, regardless of any LNG usage, is approximately \$150,000 - \$250,000 for a three-month period. The actual cost of LNG is dependent upon usage, natural gas prices, liquefaction and transportation costs. The cost of LNG trucked to Idaho during the winter months is estimated at \$0.80 - \$1.20 per therm.

## **Compressor Stations**

Compressor stations are typically installed on pipelines or laterals operating at higher pressures with a fairly significant gas flow. IGC currently has only two such pipelines of which the installation of a compressor station would be practical – the Sun Valley Lateral and the Idaho Falls Lateral. Regulatory and environmental approvals would be significant while engineering and construction costs for a compressor station capable of providing a 100,000-200,000 therm per day capacity increase is approximately \$2,000,000 - \$3,000,000. Fixed O&M costs are approximately \$100,000 - \$150,000 per year.

## **DISTRIBUTION SYSTEM MODELING**

Gas flow through a pipe falls under the engineering discipline of fluid mechanics. Due to the nature of fluid flow, there is a finite amount of gas that can flow through a pipe of a certain size and length. Engineers in the field of gas distribution can use the laws of fluid mechanics to approximate flow conditions of gas through pipes. Ultimately, it is total throughput or system capacity that is desired to be known during peak demand.

Gas distribution networks, or systems, rely on pressure differentials to move gas from one place to another. If the pressure is exactly the same on both ends of a particular system, gas will not flow. When gas is removed from some point on a system (i.e. regulator station, house meter, industrial customer) to get to an appliance or boiler, the pressure in the system at that point is then lower than the pressure upstream in the system. This pressure differential causes gas to move from the higher pressure point to the point of removal in order to equalize the pressure throughout the system. The same principle keeps gas moving from the interstate transmission lines to the local distribution company's distribution system to the residential meters and ultimately to the appliances inside the homes. Therefore, it is important that gas engineers design a distribution system in which the beginning pressure (from regulator stations) within the system is high enough so that a feasible and practical pressure differential is created when gas leaves the system.

When the total load exceeds the system capacity, the pressure at the far end of the system becomes zero and the system basically runs out of pressure. Using the laws of fluid mechanics, engineers determine the maximum flow of gas through a distribution system of various pipe diameters and lengths that will not cause significant pressure drops. This process is known as "distribution system modeling."

The modeling process is important because it allows the engineer to determine the capacity of various distribution systems. For example, if a large usage customer were added to a distribution system, the engineer must evaluate the existing system and then determine whether or not there was adequate capacity to maintain the new customer along with the existing customers. Modeling is also important when planning new distribution systems. The correct size of pipes must be installed to allow for the flow needed to meet the requirements of current customers and reasonably anticipated future customers. Also, existing system capacities can be evaluated using the model by gradually increasing the loads throughout the system until the pressure loss within the system becomes unacceptable.

### **Modeling by Town**

In December, 1992, IGC purchased a gas network analysis software program from Stoner Associates allowing the engineer to model all sizes of distribution systems. The software program was chosen for its reliability, versatility and power. Using the software, individual models are created for each of IGC's various distribution systems, including high pressure laterals, intermediate pressure systems and distribution system networks.

The model of the various systems is constructed as a group of nodes and elements. A node is defined in a system as being a point where gas either enters or leaves the system, change in pipe diameter or the connection of pipe. An example of a node in a distribution system might be a number of homes within a subdivision, a small commercial load, or a large industrial load. An element is defined in a system as the various sizes of pipe, regulator stations or compressor stations, which make up a distribution system. A model for a small sized town typically consists of approximately 100 - 300 nodes and 250 elements, a medium size town typically consists of 500 - 1500 nodes and 1200 elements and a large city or area typically consists of 4,000 or more nodes and 4,000 or more elements.

The software program allows the engineer to input and/or change the gas load at an individual node, some or all nodes. By using the forecasted loads within this integrated resource plan, IGC engineers can determine anticipated future constraint areas based on the calculated pressure drops. When constraint areas are found, the engineer determines the most practical and cost effective method of solving the problem.

Sometimes the solution is as simple as increasing pressure within the system, but in most situations additional pipe or looping is required. Looping scenarios can then be modeled to determine the ultimate size and location of pipe in order to maintain adequate pressures throughout the system.

## **PROMOTING THE EFFICIENT USE OF NATURAL GAS**

### **Natural Gas and our National Energy Picture**

In the United States, natural gas currently meets 24% of the nation's energy needs, heating 52% of American homes, and providing needed energy to manufacturing plants, commercial businesses, and most new electric power plants. Demand for this highly efficient fuel is expected to grow by 45% by 2015.

Natural gas is the cleanest and most efficient fossil fuel. Continued expansion of natural gas usage can help address several environmental concerns simultaneously, including smog, acid rain, and greenhouse emissions.

Furthermore, 99% of the natural gas used in the United States comes from North America, where supplies are abundant. And the 2-million-mile underground natural gas delivery system has an outstanding safety record, and is reliably capable of delivering natural gas, regardless of the weather.

### **Natural Gas Equipment Efficiency**

Technology has given us many new and more efficient ways to meet our energy needs without sacrificing the environment. Over the recent years, new natural gas residential and commercial HVAC equipment and appliances have become far more efficient as Federal and State equipment efficiency standards have taken effect. And in the existing customer group, as older, less-efficient equipment wears out, it's replaced with these newer, more efficient units. Thus, the entire natural gas user base grows more efficient each year.

The adoption of more energy efficient building codes and standards – new homes and commercial structures built to higher standards driven by Federal and State codes, has meant far more efficient use of natural gas. And as with the replacement of older equipment mentioned above, older housing and commercial units are being upgraded to higher efficiency standards. Most people don't realize it, but the average household uses 22% less natural gas than it did in 1980, thanks largely to the aforementioned efficiency improvements. And by using energy wisely, consumers will continue to use less, and therefore help control their energy costs.

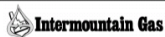
The Gas Technology Institute continues to perform important ongoing research and development work in the gas equipment arena, from residential to large industrial. GTI is not just developing new uses for natural gas, but also improving the efficiency and cleanliness of existing applications. IGC has participated in local GTI research and development projects, and will continue that collaboration as the opportunities arise.

Natural gas equipment efficiency makes economic sense in today's new energy era, and IGC will continue to encourage new residential and commercial technologies, as they become available.

### **Natural Gas Conservation Customer Education**

On our website, [www.intgas.com](http://www.intgas.com), customers can obtain detailed information regarding energy conservation at home or their business. Also at the website, customers can view our Energy Conservation Brochure, which was mailed to all our +240,000 core-market customers in October 2003. The web version of this brochure contains a link to the Idaho Department of Water Resources Energy Division. IDWR offers low-interest loans for energy efficiency upgrades, including space and water heating equipment, insulation, and duct sealing. The Energy Conservation Brochure in hard copy is also available at all of our customer contact offices throughout the IGC service territory.

Money Saving Energy Ideas



## Energy Conservation Tips

**Helpful Hints on how to:**

- Lower your energy costs
- Increase your family's comfort
- Obtain information on Energy Assistance Programs

**Taking the time...**  
*to just check little things will make a big difference in how much natural gas you use and how much you spend on your natural gas bill.*

**Thermostats**

*In homes heated and cooled with forced air systems, an automatic setback thermostat is a good investment. They help maximize your energy savings without sacrificing comfort. Once programmed, it will automatically adjust the temperature settings for you.*

1. Program your thermostat to 70° or lower during the day, and 68° or less at night and when you are away.
2. You can save as much as 10% a year on your heating and cooling bills by simply turning your thermostat back 10° to 15° for eight hours a day.

**Furnace Maintenance**

*Remember to change or clean furnace filters regularly. Generally, filters should be cleaned or replaced once a month during the heating season to ensure they don't restrict the flow of air.*

*Furnaces consume less energy if they "breathe" more easily.*

**Heating Registers**

- Be careful not to block heating registers. Move furniture away from registers to allow heat to flow freely.
- If you have rooms that are not being used, consider closing the heating registers and doors. However, be sure not to close more than one-third of the total heating registers in your home, as it may cause the furnace to cycle more frequently, and may restrict proper air movement in your home.

**Hot Water**

- Set your thermostat dial at mid-range or lower on your hot water heater. Extremely hot water can lead to scalding accidents and also higher energy costs.

**Fix leaky faucets:** A hot water tap, dripping once every second, can be equivalent of wasting a bathtub of hot water each month.

*Any hot water you can save not only reduces your energy bill for heating the water, but reduces your water bill as well.*

*Use appliances such as dishwashers, washing machines, and clothes dryers only when they are full.*

**Keeping the Cold Out**

*Open drapes & shades during the day to let in the sun during the winter months. Close them at night to keep out the cold.*

*Warm air leaking out of your home during the winter, and into your home during the summer, can waste a substantial portion of your energy dollars.*

- Seal leaks around doors, windows, and other openings such as pipes or ducts, with caulk or weather-stripping.

**Fireplaces**

- Consider tempered glass doors and a heat air exchange system that blows warmed air back into the room. Any open fireplace is not an efficient heating source. Most of the heat will go up the flue and out the chimney.
- Make sure your fireplace is properly vented. Fireplaces require a great deal of oxygen. If you do not have an outside source of combustion air, your fireplace will draw air from inside your house, including the air you paid to heat.
- Keep the fireplace damper closed unless a fire is going. An open damper can let as much as 8% of your heat go out the chimney.

**Plan for long-term energy efficiency improvements:**

*Check to see if attic, walls, crawl space, and basement have recommended levels of insulation.*

*Install storm, thermal or double-pane glass doors and windows.*

*When replacing older appliances, consider replacing them with high-efficiency models. They use less energy, which will save you money.*

**The Idaho Department of Water Resources, Energy Division** has low interest loans available for furnace and water heating efficiency upgrades, insulation, duct sealing and duct insulation. You can visit them at [www.idwr.state.id.us/energy/loans](http://www.idwr.state.id.us/energy/loans) or call 1-800-334-7283 for more information.

*Plant trees on the southern and western exposures of your house – but be sure to plant deciduous trees. They provide shade in the summer and allow the sunlight to heat the house in winter, when they lose their leaves.*


**Energy Assistance Programs**

*Project Share and Project Warmth . . . are community programs that may be able to assist those who qualify for temporary assistance with their energy bills. Also, Low Income Home Energy Assistance Program (LIHEAP) is a federally funded program that provides a one-time (per program year) benefit to assist with heating costs.*

*Heating Assistance Pledges: Contributions can be made automatically with your Intermountain Gas Company payment each month. Participation is easy. If you are interested, just call our customer service number below and a pledge card will be mailed to you. All proceeds benefit low-income families in your community.*

*For more information about money saving energy tips or energy assistance, visit us at [www.intgas.com](http://www.intgas.com).*

Or call our Customer Service Center:  
377-6840 (Boise/Treasure Valley)  
1-800-548-3279 (other areas)  
7:00 a.m. to 7:00 p.m. Monday-Friday



In addition to bill paying and other services, IGC customers can also access their individual billing and gas consumption history on the website. Customers can enroll online or by phone. The process is easy, and access is immediate. IGC customer communications, mass-media advertising, website, and marketing information all encourage customers to consider high-efficiency equipment when making their equipment purchase or upgrade decisions. We recently completed a 30-second TV commercial wherein our company spokesman, Jerry Kramer, offers a variety of energy saving advice measures, including automatic setback thermostats. This commercial also promotes the [intgas.com](http://intgas.com) website as a source of conservation information. This conservation video message is available for viewing on our website.

We have recently added a detailed 10-minute conservation tips video to our website. This video was produced by the Alliance to Save Energy and our AGA partner, Washington Gas. It gives a wide variety of energy saving instruction and advice, including do-it-yourself installation of insulation, storm windows, and weather-stripping, as well as how-to's for natural gas conservation measures and practices. Customers will be able to view the entire video, or select segments that deal with particular conservation-minded tasks and instructions. Intermountain will show this video during our IRP public meetings, and will conduct additional conservation seminars to highlight this presentation. Wherever possible, our communications messages promote the use of our website for such information. A DVD copy of the video is contained in Exhibit No. 6.

Intermountain's customer contact and marketing personnel are equipped to assist current and potential customers with evaluating the advantages of installing high-efficiency gas equipment where possible.

Intermountain will promote high-efficiency gas furnaces through our involvement in the 2005 Parades of Homes around our service territory. Sponsorship assistance will be focused on those builders whose Parade homes have a 90% efficient natural gas furnace. We hope to collaborate with the Northwest Energy Efficiency Alliance Energy Star promotion of high-efficiency furnaces in the Pacific Northwest beginning sometime in 2004.

Intermountain has a long history of promoting the efficient use of natural gas by our customers. Over the years, IGC has offered rebates and incentives for the installation of energy saving devices such as pilotless furnace ignition systems, furnace flue dampers, and still to this day, a high-efficiency (90%) furnace conversion rebate.

Our website also promotes the IGC Gas Equipment Finance Program. Wells Fargo Bank is the lender in this program. This program provides current and prospective customers an equipment-financing avenue that includes competitive rates and an expedited approval process. It's another financing avenue that enables consumers to replace older equipment with new, higher-efficiency units, and other energy saving measures, such as energy-efficient windows, and insulation upgrades.

IGC remains a partner in the Rebuild Idaho energy efficiency campaign targeted toward our state, municipal and county entities, our school districts, and our institutions of higher education. IGC is an active voice in Idaho's legislative process as the lawmakers consider new, higher-efficiency building and energy codes.

### **Energy Efficiency Through The Direct Use of Natural Gas**

Another, bigger-picture aspect of efficient natural gas usage is the concept of direct use, whenever possible. "Direct use" refers to employing natural gas at the user point for space heat, water heating, and other applications, as opposed to using natural gas to generate electricity to be transmitted to the user point and then employed for space or water heating.

As hydroelectric generating capacity becomes more constrained in the Pacific Northwest, additional generating capacity either under construction or planned will primarily be natural gas fired. Direct use will mitigate the need for future generating capacity. If more homes and businesses use natural gas for heating and commercial applications, then fewer new generating plants will be needed. And at times of excess capacity, water storage normally used for generating power, can be released for additional irrigating, fish migration, and navigation uses.

Natural gas fired combustion turbines are generally 60 – 65% efficient at best. Further- more transmission and distribution losses can total another 5 – 10%. Effectively, half of the energy originally contained in the natural gas has been lost before arriving at the point of use. High-efficiency natural gas furnaces are rated at 96% efficiency. New 2004 gas water heater efficiency standards provide for 67% efficiency. So from a resource and environmental basis, direct use makes the most sense. More energy is delivered using the same amount of natural gas. Thus, lower cost and lower CO<sub>2</sub> emissions spread out over a far wider airshed. This direct, and therefore, more-efficient natural gas usage will serve to keep natural gas prices, as well as electricity prices, lower in the future. Our success in marketing to Idaho's residential new construction market, where we have nearly a 100% penetration rate along our service mains, is a prime of example the direct use of natural gas, where possible.

### **Natural Gas and Avoided Electrical Generation and Transmission**

To illustrate the significant role that IGC plays in southern Idaho's total energy picture, IGC has over 218,000 residential customers. The average annual therm usage of an IGC space-heating-only customer is 608 therms. That equates to a total residential therm usage of 132,544,000 therms in a year. If the total was used at the Federal efficiency minimum of 78%, then  $(132,544,000 \times .78 = 103,384,320 \text{ therms} \times 100,000 \text{ btu's/therm})$  or 10,338,432,000,000 btu's were generated. (A therm is 100,000 btu's of heat.) There are 3,412 btu's in a kilowatt-hour. At 100% resistance heat efficiency, this means that the IGC residential space-heat customers would use the equivalent of  $(10,338,432,000,000 / 3,412)$  or 3,030,021,102 kilowatt-hours to heat their homes. This is the same as 3,030,021 megawatt hours of power saved, year in, year out. According to their website, Idaho Power's total annual residential megawatt hour sales for 2002 were 4,447,155. Were the aforementioned 218,000 IGC residential customer using electric space heat, Idaho Power's total residential sendout would rise to 7,477,176 mWh, a 68% increase.



In peak terms, if these 218,000 IGC customers had electric furnaces with 25kw capacity, and just 1/3 of them were operating simultaneously during a cold-weather winter peak, there would be an additional winter peak load of 1,817 megawatts. Again, according to their website, the Idaho Power Winter 2002 peak load was 2,131 megawatts. Without the direct use of natural gas to heat these 218,000 homes, Idaho Power's winter peak load could reach 3,948 megawatts, an 85% increase! This additional 1,817 megawatt peak load would be the equivalent of over seven 250 megawatt natural gas-fired electric generating facilities all running at full throttle. This would probably also require a substantial increase in transmission facilities to handle this peak load, since it would be well above the Idaho Power Summer 2002 peak of 2,963 megawatts.

In terms of recently-shed electric load, just since 1991, IGC has converted over 25,000 residential electric heating customers to natural gas. Using the space heating consumption rates shown above, these gas conversions save about 347,000 megawatt hours of residential sendout per year. In winter peak terms, using the "1/3 operating simultaneously" example in the paragraph above, 208 megawatts of peak load is saved. This "year in, year out" electrical conservation is realized at no cost to the electric customers in Southern Idaho. IGC's television advertising and other efforts promote direct use by actively targeting the conversion market. All of the sendout and peak savings illustrations above consider only residential space heating. If residential natural water heating were included, the annual sendout figures would rise by at least 25%.

In terms of summer energy consumption, IGC residential water heaters also provide some relief to the ever-growing hot weather electric demand. IGC has over 160,000 RS-2 (space and water heat) customers. If, instead these were 160,000 electric water heaters each rated at 9,000 watts, or 9kW, this would amount to 1,440 megawatts of total load. If this total amount was treated as shifted or curtailed, per the recently approved Utah Power and Light irrigation load control credit rider, the credit value would range from \$1,382,400 in September to \$3,225,600 for July. But the summer water heating load curtailment and shifting provided by the IGC water heater customers comes at no cost to electric utilities or their customers.

### **Enhancing Our Industrial Customers Efficient Use of Natural Gas**

Intermountain Gas Company has recently developed and employed technology enhancements which allow our industrial customers the ability to access their natural gas usage data "real-time" in a secure manner via the Internet. Industrial customers processes can be energy intensive. Through the use of these technology enhancements, Intermountain has facilitated a more accurate and real-time correlation between an industrial customer's energy consumption and plant production thereby increasing our industrial customer's ability to develop and establish energy efficiency gains. Intermountain has entered into a "trial period" with selected customers, whereby these selected customers are being asked to use the technology and provide feedback regarding the same. This feedback will be evaluated for potential future enhancements to the program. Intermountain expects that during late 2004, this technology will be offered to all those industrial customers that currently provide natural gas usage input into Intermountain's Supervisory Control and Data Acquisition ("SCADA") system.

### **Conclusion**

Ever-increasing and more pervasive energy standards and practices will continue to improve the energy efficiency of Intermountain Gas Company's customers. Intermountain will continue in its active role promoting the wise and efficient use of natural gas. The wise, direct use of natural gas in the coming years will help keep overall energy costs down in southern Idaho, and will ensure ample, lower-cost electricity for its many other valuable uses.

## RESOURCE OPTIMIZATION

### Introduction

The IRP model is an optimization model that selects resources over a pre-determined planning horizon to meet forecasted loads by minimizing the present value of fixed and variable resource costs. The model evaluates and selects least cost supply and transportation resources utilizing a standard mathematical technique called linear programming.

This summary will first describe the model structure and its assumptions in general. Initial results will then be discussed.

### Components of the Model

The IRP model has three basic components:

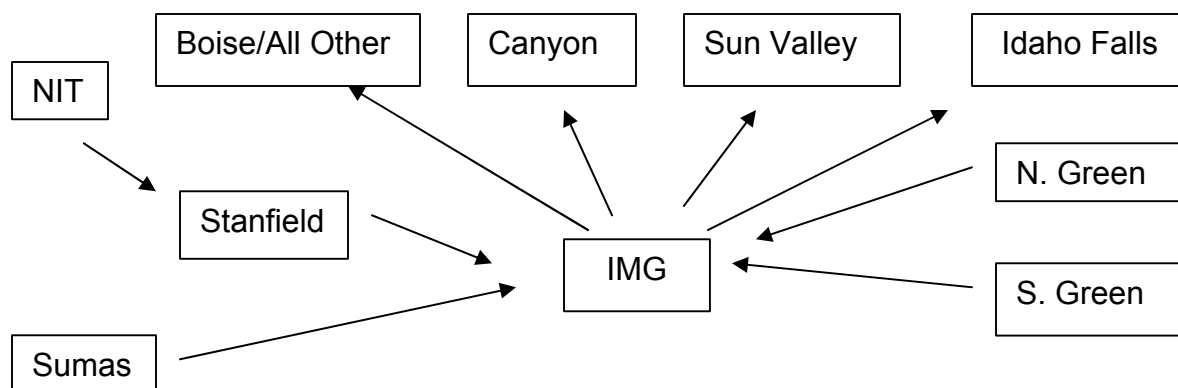
- Demand forecast (See Exhibit No. 5, Appendix A)
- Supply resources (See Exhibit No. 5, Appendix B)
- Transportation resources (See Exhibit No. 5, Appendix C)

Underlying these three components is a structure of supply sources, transport capacity (arcs) and demand areas (nodes) which mirror how the IGC system contractually operates (see below). In any IRP model, there must be a balance between modeling in sufficient detail to capture all major economic impacts while at the same time, simplifying the system so that the model operates efficiently and the results are understandable. For an IRP model such as IGC's, where major supply and transport additions are being evaluated over a 5 year period, only major elements need to be recognized. This is in distinction to a dispatch model which needs to balance precisely requiring detail more fully representative of the system requirements. For this reason, a simplified structure is utilized in this IRP model.

### Model Structure

The following table and graphic presents the demand and supply nodes and transport arcs of the IRP model.

Area #	1	2	3	4	5	6	7	8	9
Name	Sumas	Stanfield	Boise	Idaho Falls	N. Green	S. Green	NIT	Sun Valley	Canyon



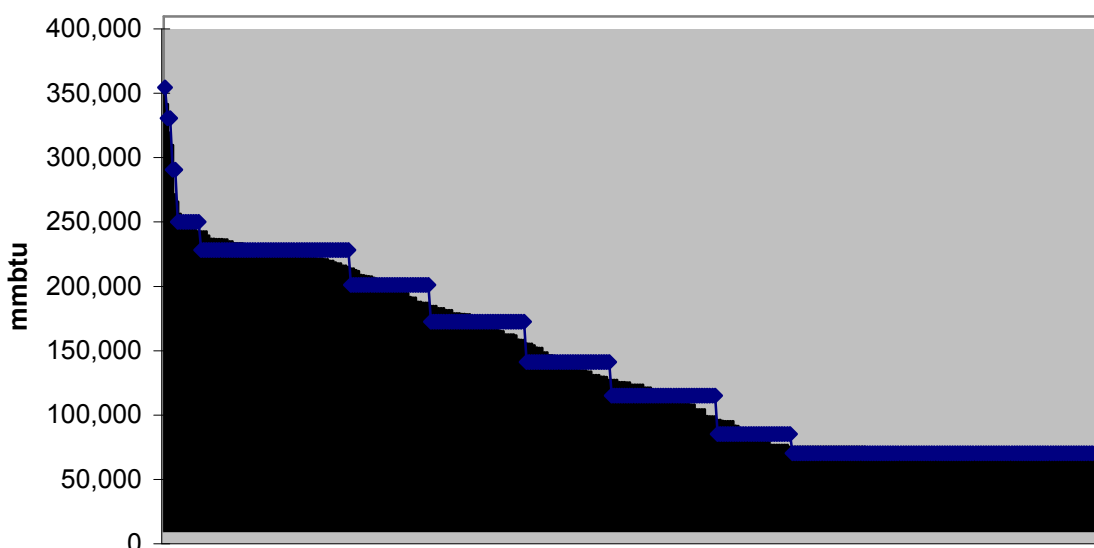
## Demand Areas and Forecast

Four demand areas, or nodes, are designated: Canyon County, Sun Valley, Idaho Falls and Boise/All Other. Idaho Falls, Canyon County and Sun Valley reflect all loads served off those specific “laterals” and are separated in order to facilitate the evaluation of distribution capacity enhancements for those laterals. Boise/All other represents all loads outside of those demand nodes.

The model utilizes a peak-to-low load duration curve (“LDC”) to represent the demand forecast. The graphic below depicts a sample LDC for the total system. This type of LDC summarizes load information from highest to lowest daily usage. The LDC approach is utilized for an IRP rather than a chronological approach to capture the general forecasting problem of planning for peak, shoulder and base demand in distinction to short term or daily dispatching. Design weather and projected customers are used to model forecast load requirements.

To simplify modeling, the LDC is aggregated into periods with similar load characteristics, to represent load changes over the entire year with a minimum of data points. (See Exhibit No. 5, Tale 5.1) The bold horizontal lines in the figure below provide an example of the aggregation periods utilized in the model. The model actually utilizes four separate LDCs so as to separately represent the Boise/All Other, Sun Valley, Canyon County, and Idaho Falls demand characteristics. The model assumes that IGC must provide gas supply, interstate and distribution transportation for core customers and only transportation for T-1 and T-2 customers. The T-4 customer’s usage is only included for the distribution system.

**Load Duration Design Base FY03**



## Supply Resources

Resource options for the model are of two types: storage resources and supply contracts; all are utilized in a similar manner. All resources have beginning and ending years of availability and they also have an annual flow capability and a peak day capability. They can be assigned both variable and fixed costs. Additionally, information relating to storage resources includes injection period, injection rate, fuel losses and other storage related parameters are included.

Each resource must be designated to a delivery area. One advantage of certain storage facilities is that no additional mainline transport is required since the resource is either sited within a demand area node or is bundled with its own redelivery transport capacity. Resources can be delivered into the IGC (or "IMG") system from Alberta (Nova Inventory Transfer or "NIT"), Sumas, Stanfield, North of Green River, or South of Green River, utilizing the appropriate transport arcs. Additionally, IGC system storage can be directly applied to the LDC for any demand node.

## **Transport Resources**

Transport resources can be contracts for capacity such as those with Northwest Pipeline (NWP) or National Gas Transmission ("NGT"), or for distribution mainlines such as the Idaho Falls lateral. Transport resources are explicitly associated with arcs in the model, which are usually contracts between supply and demand areas. For example, supply resources to be delivered from Sumas to Idaho Falls, first must use the Sumas to the IMG arc and then form IMG to Idaho Falls arc. The system representation generally recognizes NWP's postage stamp pricing and capacity release.

Transport resources have a peak day capability, which is assumed to be available year round, unless otherwise noted. Transport resources can have different cost and capabilities assigned them as well as different years of availability. For example, different looping options for the Idaho Falls lateral are available to the model at different periods to facilitate timing decisions.

## **Model Operation**

The selection of a best cost mix of resources, or resource optimization, is based on the cost availability and capability of the available resources as compared to the projected loads. The model chooses the mix of resources which best meet the optimization goal of minimizing the present value cost of delivering gas supply to meet customer demand. Both the fixed and variable costs of transport, storage and supply are included. The model will exclude resources it deems too expensive.

The model can treat fixed costs as sunk costs for certain resources. If a fixed cost or annual cost is entered for a resource, the model will include that cost for the resource in the selection process that will influence its inclusion vis-à-vis other available resources. If certain resources are committed to and the associated fixed cost will be paid in any event, only the variable cost of that resource is considered during the selection process. However, any "new" resources, which would be additional to the resource mix, will be evaluated using both fixed and variable cost.

The model operates in a PC environment. Inputs and outputs are in a spreadsheet format. The optimization is preformed by PC linear programming software.

Once the model computes the best resource mix, it writes the results to spreadsheet files, which are then organized by a set of macros in a summary spreadsheet.

## **Special Constraints**

As stated earlier, the model minimized cost while satisfying demand and operational constraints. Several constraints specific to IGC's system were modeled in the IRP model.

- LNG, SGS, and LS storage either does not require redelivery transport capacity or has its own transportation for withdrawal; transportation utilization of this capacity must match storage withdrawal from these facilities.
- The T-1 and T-2 customers' transportation requirements are met utilizing IGC transport capacity but no supply resources are provided.

- The T-4 customer transportation requirements utilize only Intermountain's distribution capacity.
- Resources to the lateral nodes (e.g. such as Idaho Falls) must be transported first to IMG, and then from IMG to the lateral.

## Model Results

The IRP optimization model for the five-year study, FY05 through FY09, is presented and discussed below. The results of the model are summarized, by demand scenario, by four types of tables:

- Resource Utilization Table
- Transport Utilization Table
- Storage Injection Table
- Annual Cost Summary

To refer to these tables please see: Baseline: See Exhibit No. 5, Appendix D; High Growth: See Exhibit No. 5, Appendix E; Low Growth Scenario: See Exhibit No. 6, Appendix F:

Each of these tables will be discussed as well as the results for years 1 and 5. The changes in model results between year 1 and year 5 will be summarized. The results for years 2 through 4 are available for review as part of the applicable appendix, but these tables will not be discussed.

## Resource Utilization - General

The Resource Utilization Table (See Exhibit No. 5, Appendix D) provides usage information on supply and resources available to IGC. Column 1 corresponds to the resource number. Column 2 corresponds to a resource acronym, which the model utilizes for printouts. The next two columns identify the arc to which the resources are delivered to NWP (or upstream arc where applicable). For example, the Sum-A resource is delivered to NWP at Sumas.

The utilization rates are the most important data determined by the model. These rates specify the percent of capability that the model determines are optimal for resources in each period. The utilization rate by period for a resource multiplied by the resources capability on an MMBtu per day basis adjusted for a loss factor results in the daily capacity of that resource that is utilized by period, columns 13 through 18. The total column represents the simple sum of the daily capacities utilized. Note that total gas flow utilized per period is the capacity utilized per day times the number of days in a period and is contained in other detail tables.

There are generally three types of supply resources; existing supply contracts, existing storage contracts and incremental/spot contracts. Transport resources include both NWP capacity and upstream NGT capacity (to bring Alberta supply to NWP at Stanfield) as well as the capacities for the three laterals on the Intermountain system. The following sections will summarize the utilization of each type of supply and transport resource for the model years 1 and 5.

The model selects the best cost portfolio based on relative variable cost pricing. However, it also has been designed to comply with operational and contractual constraints that exist in the real world (i.e. if the most inexpensive supply is located as Sumas, the model can only take as much as can be transported from that point). It should also be noted here that in order for the results to provide a reasonable representation of actual operations, all existing resources that have committed cost contracts are assigned as must run resources. Other resources are evaluated by variable cost.

Another important assumption regarding "Fill" supply is that it is treated as an economic commodity meaning that its availability is dynamic. The model can select available Fill supply at any node, for any period and in any volume that it needs up to capacity constraints. To ensure that the model provides results that mirror

reality, these supplies have been aggregated into "Peak", "Winter" and "Summer" price periods. Each aggregated group has a different relative price with the Peak price the highest and the summer the lowest. Additionally, since term pricing is now normally based on the monthly spot index price through the utilization of futures, price swaps or other derivative products, no attempt has been made to develop fixed pricing for incremental term contracts (see Exhibit No. 5, Tables 5.2 and 5.3 for pricing data).

The transportation utilization table provides the same type of information for transportation resources and is shown in a similar format as the resource utilization table. Each transportation resource has a resource number and acronym. In addition, the receipt ("from") and delivery ("to") points associated with each transport arc are listed in columns 3 and 4. Columns 5-10 show the transportation utilization rate output from the model and represent the percent of total resource available that the model utilizes by period. These utilization rates multiplied by the transport capability determine the daily transport capacity utilized by period as shown in columns 13-18.

Again, the incremental transportation "Fill" contracts are being treated as "commodity" resources in that the model can utilize this capacity in the period it needs it, but in somewhat limited volumes. The current assumption of on-demand incremental transport is likely not "real-world" since it would generally only be readily available on demand in the summer. But, selection of this type of resource in a peak or winter period would generally indicate the need for a term contract of some nature.

Transportation resources fall into four categories: existing, Lateral capacity, storage, and incremental resources. The existing resources are labeled ES (NWP) or PGT. Lateral expansions demonstrate the need for their implementation by the change in utilization rates over time.

The storage injection table provides the amount of resources injected into the various storage facilities. Just as storage may only be withdrawn in the peak and winter periods, injections may only occur in winter, reflecting the actual withdrawal cycle in the winter and the injection cycle in the summer. The injection rate multiplied by the injection MMBTU and the loss factor results in the net MMBTU injected by period.

## **Summary Results – Baseline – Year 1**

### **Supply.**

The existing supply resources contracts 1 - 11, respectively, have utilization rates of 1.0 (or 100%) for all available periods meaning that these resources are utilized at maximum capacity in all demand periods. This is due to contractual take obligations.

Storage facilities are fully withdrawn over Peak periods. In some instances, annual usage is less than full annual capability, but annual minimum withdrawals are achieved. There are a number of factors affecting shoulder usage such as cost, withdrawal capability, and transportation capacity. As loads continue to grow, further utilization of these facilities can be expected.

Resources labeled as T1&T2-"xx" represent the non-core customer load resources. These resources are included to ensure that year-round interstate transportation capacity is available for the non-core, firm transportation customers. The resources labeled as T-3 and T-4 represents the distribution system CD in order to ensure that distribution capacity is available for this transport load.

The remaining resources are general supply resources that are tied to Nymex Futures hub spot prices, which are used to fill in relative needs in various periods. These resources are selected by the model only after existing contract supplies are utilized, due to pricing or contractual constraints.

**Storage Injections.** As described above, injections may only occur in the summer period and after factoring in fuel losses, total injections match the withdrawals in the other periods for each facility. Although the storage cycle can overlap years (e.g. injections could actually occur in a subsequent year) in the real world, the nature of this model has resulted in a closed system: net injections must equal net withdrawals.

**Transportation.** Given the need for incremental interstate capacity as highlighted the Company's previous IRP filing, Intermountain secured additional capacity. 250,000 therms of new capacity are available by the beginning of year 1 and another 150,000 therms/day will come on by year 5. The model indicates that Intermountain has sufficient interstate capacity to serve the required needs through 2009.

**Annual Cost Summary.** Exhibit 5, Appendix D summarizes the dollar cost of the resources selected by the model, show the cost of supply resources utilized, reflects the transportation costs as determined by the model, and lists a grand total of all resource costs and calculates a net present value cost for comparative purposes.

### **Summary Results - Year 5**

**Supply.** By the fifth year, the utilization of supply resources has changed somewhat to respond to load growth. Supply resources 1 through 11, are still utilized at full capacity when available. The model is selecting approximately 60,000 MMBtu of incremental/spot supply during peak periods to fill the growing loads.

**Storage Injections.** Storage is fully utilized, both on an annual and peak day basis. Injections in year 5 are higher than in year 1 due to the increase change in storage withdrawals and still occur in period 6 for all 5 storage facilities. The selection of a "Citygate" supply resource suggest the Company may want to investigate further needle peaking supply or other peaking resource by year 5.

**Transportation.** As before, the Company has sufficient interstate capacity year around. Two lateral expansions have been selected on the Idaho Falls lateral, while both Sun Valley and Canyon County have utilized lateral expansions as well.